Annex D: Materiel

Army Transformation is about changing the way the Army deploys, fights, and uses information to become more strategically responsive and dominant across the spectrum of operations. Objective Force formations will be designed and structured for rapid response and deployment, including the capability to conduct operational maneuver over strategic distances employing overmatching combined arms in decisive operations. Exploiting the full potential of forward-deployed forces and prepositioned stocks, Objective Force formations will be able to respond rapidly to crises anywhere in the world. Modular, fully interoperable Objective Force units will provide the Joint Force Commander a capability to bypass choke points, anti-access/area denial efforts, and enemy centers of resistance, and strike directly at tactical and operational objectives and adversary centers of gravity. Objective Force units arrive immediately capable of simultaneous, distributed, and continuous day/night combined arms operations in all weather and all terrain conditions. As an information-enabled force, Army tactical formations will input to and leverage Army and joint command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) network to enable them to see first, understand first, act first, and finish decisively. Objective Force formations will exploit the Joint Common Relevant Operating Picture (CROP) to achieve unparalleled decision superiority. Harnessing the power of information and networking combat operations will enable Objective Force units to increase their lethality, precision and survivability even while dramatically reducing their physical mass and "footprint."

This annex of the *2003 Army Modernization Plan* focuses on selected Army materiel programs that play a significant role in the Army's effort to transform itself into a strategically responsive Objective Force. Correspondingly, emphasis is on those key programs that are being developed exclusively for the Objective Force, such as the Future Combat Systems (FCS) and complementary systems. However, this annex will also review those key systems that are being fielded to the Legacy Force but will transition to Objective Force units in the future. A limited portion of the annex will also review certain high-priority programs associated solely with the Legacy Force, and which are funded at significant levels in President's Budget Fiscal Year 2004 (PB04), such as upgrades to the Abrams main battle tank.

Organization of the annex into six appendices mirrors those transformational goals articulated by the Secretary of Defense (SECDEF) in the 2001 Quadrenniel Defense Report (QDR) and in recent version of the Defense Planning Guidance. The appendices are as follows:

- Protecting critical bases of operations (U.S. homeland, deployed forces, allies, friends) and defeating chemical, biological, radiological, nuclear, and enhanced high explosive (CBRNE) weapons and their means of delivery.

- Projecting and sustaining U.S. Forces in distant anti-access or area-denial environments and defeating anti-access and area-denial threats.

- Denying enemies sanctuary by providing persistent surveillance, tracking and rapid engagement with high-volume precision strike, through a combination of complementary air and ground capabilities against critical mobile and fixed targets at various ranges and in all weather and terrain.

- Assuring information systems in the face of attack and conducting effective information operations.

- Enhancing the capability and survivability of space systems and supporting infrastructure.

- Leveraging information technology and innovative concepts to develop an interoperable, joint C4ISR architecture and capability that includes a tailorable joint operational picture.

As the Nation fights the Global War on Terrorism and prepares for future conflict, the Army has taken significant steps to ensure the lethality and survivability of its deployed forces and those forces which may be deployed into operational areas. While a detailed layout of those actions, past and planned, is beyond the scope of this annex, recent actions taken by the Army include:

- Distributing stocks of new chemical protective equipment and sensors and developing strategies to defeat any emerging chemical or biological battlefield threat.

- Taking steps to reduce the possibility of battlefield fratricide by providing deployed units with vehicle combat identification and thermal identification panels, vehicle identification lights, and thermal tape for individual Soldier identification.

- Fielding improved body armor and small arms protective inserts to ensure Soldier survivability.

- Redistributing Army Battle Command System (ABCS) components to ensure digital interoperability across the deployed force, which will increase force situational awareness, lethality, and survivability.

- Increasing allocation of munitions to support mobilization and deployment.

- Providing forward-deployed forces with enhanced lethality options by fielding Javelin anti-tank missiles, enhanced penetrating 120mm tank munitions, and the fielding of 120mm mortars to light infantry units.

- Improving urban area warfighting capability by fielding urban breaching kits.

As part of the ongoing operational efforts, the Army is developing a funding and procurement strategy to replenish depleted munitions and nuclear, biological, and chemical (NBC) protective war reserve stocks.

Appendix 1: Protecting Critical Bases of Operations (U.S. Homeland, Deployed Forces, Allies, and Friends) and Defeating CBRNE Weapons and Means of Delivery.

Critical bases of operation are focal points from which national or combat power is generated. They exist at the strategic, operational, and tactical levels; and the Army plays a key role in protecting these bases of operation by providing air and missile defense (AMD) capabilities and chemical, biological,

radiological, and nuclear (CBRN) defense capabilities.

The Army provides full dimensional protection to the homeland, our allies and friends, and the Joint Force. The defense of national or host nation assets and national centers of gravity are vital to the strategic level of operations. The ability to rapidly, efficiently, and safely project the force into an area of operations (AO) or area of responsibility (AOR) and the defense of those forces, once inserted into an AOR, are essential if the Joint Force is to conduct operations at the operational and tactical levels. The Army's AMD and CBRN forces play a vital role in defending centers of gravity and operational enablers at all levels of operations.

The Army employs a holistic concept for AMD to counter theater ballistic missiles, cruise missiles, unmanned aerial vehicles, tactical air-to-surface missiles, rockets, artillery and mortars, and rotary/fixed winged aircraft threats. The four pillars of AMD operations (active defense, attack operations, Battle Management, Command, Control, Communications, Computer, and Intelligence (BMC4I), and passive defensive) are the cornerstone for this holistic defense. Active defense operations—the defense of a critical base or asset with an AMD system—is the traditional mission of AMD forces and the focus of the appendix's materiel solutions. Attack operations is offensive action taken by Army and Joint Forces to defeat the air and missile threat prior to launch. Through detailed, automated and collaborative AMD intelligence and preparation of the battlefield (IPB), and by exploiting joint and national intelligence, surveillance, and reconnaissance (ISR), a preemptive and proactive attack plan will be developed and executed to defeat the aerial threat before it can attack friendly assets. Additionally, by exploiting the benefits of a robust and responsive joint BMC4I , timely and accurate data will be exchanged, enabling rapid targeting and responses to destroy threat air and missile launch platforms or support bases in a post-launch attack phase. Army Tactical Missile System (ATACMS), attack aviation, Special Operations Forces, and the Joint Forces' attack aviation and long-range fires are the kill mechanisms for attack operations. Finally, passive defense operations are the measures taken to minimize the vulnerability of friendly assets or forces to attack or mitigate the effects of an attack. AMD systems play a critical role in providing early warning and attack alerts to forces and bases of operation, while CBRNE systems provide the means to assess and mitigate the effects of weapons of mass destruction/effect in support of this pillar. Army and joint systems, coupled with mature joint doctrine and tactics, techniques, and procedures (TTP), support each of these pillars and provide a synergistic effect that enhances the Joint Force Protection mission area and defeats the diverse range of air and missile threats.

The Army's dedicated CBRN defense units and enhanced NBC medical treatment capabilities, significantly negate the effects of threat CBRN weapon employment. The Army's concept to employ "focused defense" against CBRN weapons enables units to operate at the lowest required protective posture without increasing risk to the Soldier. NBC and operational reconnaissance and surveillance units, with their point and standoff detectors, are the principal means of contamination avoidance. The Army is also augmenting installation commanders with the ability to respond to terrorist and CBRN attacks through enhanced capabilities and training.

The Army's Transformation is creating an Objective Force that is dominant across the full spectrum of military operations—persuasive in peace, decisive in war, preeminent in any form

of conflict—and fully capable of defending the homeland. This force must be responsive, lethal, deployable, survivable, and sustainable. Army AMD and NBC defense assets are also transforming to support the Objective Force's needs and to enhance their capabilities to protect critical bases of operations, thereby conserving the force's fighting potential and enabling it to deploy and respond at the decisive time and place.

As the Army focuses on becoming more strategically responsive and improving its ability to overcome anti-access and area-denial efforts, developing, funding and fielding Army AMD and NBC programs will become increasingly more important. These critical systems and the sound, doctrinal operational concepts they support provide capabilities that enable anti-access protection, and control of AORs to ensure friendly forces maintain freedom of action during deployment, maneuver, and engagement.

The Army's AMD and NBC modernization effort is directly in line with Department of Defense's (DoD's) critical operational goals, the *Army Transformation Roadmap* and *Joint Vision 2020*, and supports the recommendations of the Defense Planning Guidance and the *2001* Quadrennial Defense Report. The Army's protection capabilities will continue to improve against an expanding, significant threat arsenal, which includes information operations, terrorist attacks, and other asymmetric threats. The results of the Army's effort will be improved freedom of action for friendly forces and better protection of critical assets, both at home and abroad.

This portion of the appendix focuses on the Army's AMD and NBC defense capabilities that are essential to supporting Army Transformation, homeland defense, and protecting the Joint Force. To ensure that Army forces are protected throughout the full spectrum of operations, these assets must be responsive, versatile, lethal, deployable and sustainable for the duration of operations.

Air and Missile Defense Capabilities

In concert with the concepts, capabilities, and design characteristics of the Objective Force and to meet the challenges in the future operational environment, AMD has assumed a new mission—Army AMD forces, together with joint, multinational, and interagency forces, will dominate, control, and exploit the third dimension of the joint battlespace to win across the spectrum of conflict. The revised mission requires AMD to dominate the airspace; to control the airspace; and to exploit the airspace. To appreciate the full scope of this mission, a clear understanding of the terms **dominate, control, and exploit** is essential.

Dominate. Dominate is defined as prevailing or predominating over the airspace. The three tasks associated with dominating the airspace are: 1) to execute Army engagements ensuring interdependent joint force air superiority, 2) to extend defensive counter-air range both vertically and horizontally, and 3) to support proactive offensive operations. Dominating the third dimension of the joint battlespace serves a twofold purpose: to ensure the Force Commander's vertical and horizontal freedom of maneuver, and to render the opposing force incapable of effectively interfering with joint and multinational operations. Dominating the airspace provides full-dimensional protection for the force.

Control. Control is defined as exercising, regulating, and governing the Army use of airspace in close coordination with the joint airspace control authority. Airspace control

has a single task—to provide positive (vice procedural) coordination, integration, synchronization, and regulation of Army use of the airspace. Control has three purposes: to assure discrimination of all airspace objects, virtually eliminating the risk of fratricide; to enhance force protection for air and ground forces; and to increase the overall effectiveness of the force. Airspace control is a critical enabler for the Joint Force in that it fully synchronizes use of the third dimension.

Exploit. Exploit is defined as taking full advantage of all capabilities and/or information derived from AMD or third dimensional command, control, communications, and computers (C4) and intelligence, surveillance, and reconnaissance (ISR) sources. The two tasks associated with exploiting the airspace are to provide situational awareness and understanding to the force and to provide focused early warning to military forces and civilian authorities. The purpose of exploiting information superiority is threefold: to enable opportunities for commanders to set the OPTEMPO; to optimize the execution of Army, joint, and multinational operations; and to deny the enemy an information advantage. Exploiting the airspace enables not only airspace information superiority, but contributes to overall information superiority.

The new mission is synchronized with J*oint Vision 2020* and the Army Vision. While continuing to ensure protection of the force, it also encompasses the capabilities for extended-range surveillance, empowerment of information superiority, and positive control of the airspace.

Role in the Army

AMD provides protection of critical bases—Army and joint—across the spectrum of operations. AMD elements will be employed in the Legacy Force, Stryker Brigades, and Objective Force to execute a wide variety of overlapping offensive, defensive, stability, and support operations that are conducted simultaneously across the tactical, operational, and strategic levels of warfare.

The Legacy Force must respond when, where, and as needed as the Army executes Transformation. As the Army addresses AMD transformation, existing systems such as Patriot, Stinger, Avenger, Air and Missile Defense Planning and Control System (AMDPCS), and Sentinel must be adequately sustained to ensure that they remain mission-capable and combat-effective. Ensuring near-term readiness also requires that the Army consider recapitalizing critical AMD systems. In the current budget, the Army recognizes the requirement for, and funds, a recapitalization program for Patriot.

AMD systems support the Interim Force by providing situational awareness and understanding, third dimensional planning, joint interoperability and the enabling of Army airspace command and control through the fielding of Air Defense and Aviation Management (ADAM) cells. During the Interim Force fielding period, the Army will continue to examine emerging technologies which could improve AMD capabilities in Stryker Brigade Combat Teams (SBCTs).

AMD units in the Objective Force will be substantially more capable than today's Air Defense Artillery. Objective Force AMD units will be full spectrum with special-purpose capabilities and advanced strategic responsiveness, deployability, agility, versatility, lethality, survivability and sustainability to dominate, control, and exploit the joint aerial battlespace. Protection of the Joint Force encompasses the tactical, operational, and strategic levels of warfare. At all levels, AMD

capabilities will enable the Objective Force to see first, understand first, act first and finish decisively.

Objective Force AMD capability sees first to enable joint, multinational and interagency forces to seize and maintain information superiority. AMD will see first by (1) disseminating tailored situational awareness to the force and focused early warning to at-risk forces; (2) deploying advanced sensors to conduct extended-range surveillance, and (3) conducting counterreconnaissance, surveillance, and target acquisition (RSTA) operations to deny the enemy aerial RSTA options.

Objective Force AMD capability understands first to empower joint, multinational and interagency forces to aggressively shape the battlespace and set conditions for the fight. AMD will understand first by (1) integrating into a networked architecture to provide tailored situational awareness information and enable situational understanding; (2) fusing sensor data to create a scalable and filterable single integrated air picture (SIAP) and common operational picture for force-wide understanding of the battlespace; and (3) utilizing the SIAP and positive airspace control to eliminate fratricide and provide dynamic airspace utilization.

Objective Force AMD capability acts first to proactively protect joint, multinational and interagency forces and enable them to take decisive action at the times and places of their choosing. AMD will act first by (1) providing situational understanding and focused early warning, and providing tailored situational awareness and targeting information in support of offensive operations; (2) conducting extended-range surveillance and proactive protection to deny the enemy the ability to influence the operational area in the third dimension; and (3) conducting positive airspace control to coordinate and synchronize users of the third dimension.

Objective Force AMD capability finishes decisively by deterring and destroying the full range of aerial threats both offensively and defensively to facilitate the ability of joint, multinational and interagency forces to win decisively and successfully transition to the next engagement. AMD will finish decisively by (1) achieving combat overmatch and destroying aerial threats to protect the force; (2) enabling C4ISR for integrated fire control; and (3) providing continuous tailored situational awareness and understanding for subsequent engagements.

AMD organizations and systems in the Objective Force will reflect the culmination of ongoing system improvements, new system capabilities, and state-of-the-art technologies. They will be modular, more mobile, tailorable, and interoperable with Army, joint and multinational forces and interagency team members. They will also be fully capable of proactively protecting joint forces across the range of military operations. The development and subsequent resourcing of Objective Force AMD systems challenges the Army to pursue and analyze available technologies coupled with sound, valid operational concepts and supporting doctrine. This analysis, presently ongoing, will ensure the Army funds effective doctrine, organizations, training, materiel, leadership and education, personnel and facilities (DOTMLPF) solutions that optimize capabilities for the Objective Force.

Discussion of Key Equipment

Patriot

Description. Patriot is a corps and echelon above corps (EAC) AMD system that can

simultaneously engage and destroy multiple targets at varying ranges and altitudes. It is the world's only battle-proven theater missile defense (TMD) system. The upgraded Patriot Advanced Capability-3 (PAC-3) provides remote launch capability; increases range, altitude, and firepower with the PAC-3 hit-to-kill missile; and engages multiple maneuvering and non-maneuvering theater ballistic missile (TBM), air-breathing threat (ABT) and cruise missile threats.

Program Status. Patriot will be a key element of AMD for another 25 years. The FY04-09 Plan addresses this requirement by funding the upgrade and modernization of Patriot PAC-2, Configuration two units to Patriot PAC-3, Configuration three units and funding Patriot recapitalization efforts. Because replacement systems will not begin to emerge for at least ten years, Patriot must be kept viable for the warfighter until these replacement systems are available. Recapitalization will accomplish this by maintaining the operational capability of the Patriot system and bringing existing Patriot assets to a "like new" (zero miles, zero hours) state thereby meeting the Army's Objective Force requirements.

Patriot PAC-3 system upgrades to counter evolving threats, improve joint interoperability, and increase surveillance and detection capabilities are required as part of evolutionary development. PAC-3 Ground Support Equipment upgrades are in procurement. The PAC-3 missile is in Low Rate Initial Production (LRIP). Operational Test and Evaluation was completed in 3QFY02. A Production Defense Acquisition Board (DAB) was fully endorsed by Missile Defense Agency (MDA) and took place in October 2002. Additional upgrades include the addition of medium and high-range resolution waveforms, a dual traveling wave tube, and a new exciter to the radar; upgrades to the battalion communications equipment; and the ability to remotely locate launchers up to 30 km from the radar. These changes will improve search, detection, track, and discrimination by the radar, increase battlespace, and improve communications. Cost reduction initiatives for the PAC-3 missile are underway to produce cost savings that will be used to buy additional PAC-3 missiles. The MDA will use biennial block development approaches to increase Patriot's effectiveness. Currently, only seven of ten Active Component (AC) Patriot battalions are funded for upgrades to PAC-3, Configuration 3, allowing for a mixed force of battalions with significantly different capabilities. Additionally, the PAC-3 missile inventory shortfall continues to be a challenge. The Army's Acquisition Objective (AAO) is 2,200 PAC-3 missiles. Of the 2,200 AAO, only 1,159 funded are funded. Joint Theater Air and Missile Defense Organization (JTAMDO) missile inventory analysis pushes the PAC-3 missile requirement above 3,200.

Theater High Altitude Area Defense (THAAD)

Description. THAAD is designed to defend against short- and medium-range ballistic missiles at long ranges both inside and outside the atmosphere. THAAD will protect largely dispersed U.S. and Allied forces and geo-political assets on a wide area basis. THAAD's capability to intercept at both endo- and exo-

atmospheric altitudes makes effective countermeasures against THAAD difficult. THAAD's integration with lower tier systems allows multiple intercept opportunities and significantly mitigates the effects of unitary and submunitions. The weapon system consists of five major components (missiles, launchers, radar(s), Battle Management/Command and Control (BM/C2), and THAAD-specific support equipment).

Program Status. THAAD is in RDT&E development phase under the MDA. Flight testing begins in FY04. THAAD is projected to begin transition from the MDA to the Army in FY06-07.

Ground Based Midcourse Defense (GMD)

Description. GMD is a fixed, land-based system designed to provide limited protection to the United States against a ballistic missile attack. GMD system design focuses on ensuring high defense effectiveness against ballistic missile attacks of limited scope (e.g., accidental, unauthorized, or authorized limited launch) in a single operational configuration. The GMD Architecture is under development and review by the MDA and includes the following system elements: GMD Battle Management Command, Control and Communications (GBMC3), Upgraded Early Warning Radar (UEWR), In-Flight Interceptor Communications System (IFICS), Defense Support Program (DSP)/Space-Based Infrared System (SBIRS), Ground-Based Interceptors (GBI) and X-Band Radars (XBR).

Program Status. While National Missile Defense (NMD) was an acquisition program, GMD is a segment of the broader Ballistic Missile Defense System (BMDS), a capabilities-based developmental acquisition program utilizing a block approach. A BMDS Test Bed is under development, of which GMD is the most mature element. The Army has served as lead service for GMD since 1999, and the Test Bed was the precursor to the Objective GMD system. The Defense Planning Guidance also directed the MDA to develop options for expanding GMD beyond the Test Bed. On 16 December 2002, Presidential Directive 23 changed the program focus to the deployment of a 24/7/365 GMD operational capability by 1 October 2004 with a secondary and non-interfering mission as a test bed.

Sentinel

Description. Sentinel is a trailer-mounted radar system that detects, tracks, classifies and identifies cruise missiles, UAVs, helicopters, and fixed-wing aircraft to cue short-range air defense (SHORAD) weapons. It is employed in the division and corps area and is C-130-deployable. Data is passed through the FAAD C2 to SHORAD weapons. The Sentinel consists of a radar-based sensor system with its High Mobility Multi-purpose

Wheeled Vehicle (HMMWV) prime mover, power, IFF, and command and control interfaces. The Antenna/ Transceiver Group consists of an advanced three-dimensional battlefield air defense radar housed aboard a High Mobility Trailer (HMT) chassis. The radar employs a modern phased array antenna that automatically detects, tracks, classifies, identifies, and reports targets. Targets can be hovering or fast moving, from nap of the earth to the maximum engagement altitude of SHORAD weapons. The radar operates at X-band, transmitting 1100 pencil beams per rotation. It rotates at 30 rpm (2 second update). The instrumented range and altitude are 40 km and 4 km, respectively. The Sentinel data utilizes SINCGARS AN/VRC-92A and EPLRS AN/VSQ-2 radios. These can provide a track file of more than 60 targets.

Program Status. The program completed its primary procurement of Sentinel radars in FY01 and is currently undergoing a Pre-planned Product Improvement (P3I) program to improve its surveillance and tracking capabilities. In FY03, Sentinel radar will be fielded to 2-263 ADA (SCARNG), completing Sentinel fielding to Active Army and National Guard units that are funded to receive Sentinel. Additional upgrades and systems modifications are currently scheduled through FY08 for many AC and RC units in order to take advantages of advances in technology and software upgrades. In FY03, 12 Enhanced Target, Range, and Classification (ETRAC) modifications to the radar will be completed. There are two upgrades planned for the Sentinel fleet: Phase 1A improves the radar detection range against low observable and stealthy targets; Phase 1B improves the radar classification of low observable and stealthy targets at extended ranges. The Sentinel Phase 1B capability for target airframe classification will support the joint identification and target classification function that allows SHORAD weapons to operate at maximum effectiveness.

Surface Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM)

Description. SLAMRAAM is the line-of-sight (LOS)/non-line-of-sight (NLOS) Kinetic Energy (KE) weapon system. Program components include a heavy variant, HMMWV-based launcher platform consisting of launch rails, launcher electronics and C4 components. SLAMRAAM fires the Tri-Service AIM-120 AMRAAM and provides NLOS overmatch capability against advanced cruise missiles, UAVs, rotary wing, fixed-wing aircraft, and large-caliber rockets. SLAMRAAM provides three times the engagement range of current Stinger and Stinger based platforms.

Program Status. The SLAMRAAM ORD was approved in June 2002. The ORD is Blocked (Block 1, Block 2, and Block 3) with Milestone B for SLAMRAAM Block 1 currently scheduled for 4QFY03. SLAMRAAM Block 1

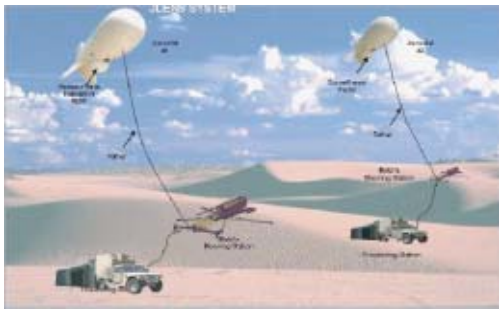
is funded in the FY04-09 Plan for the development and fielding of one battery in FY06 and one battalion in FY07.

Medium Extended Air Defense System (MEADS)

Description. MEADS, designated by Army leadership as a "clearly transformational" system, is a corps and EAC AMD system that is scheduled to replace Patriot starting in FY12 and completing in FY28. It offers a significant improvement in tactical mobility and strategic deployability, as it requires 50 percent less airlift than Patriot and can be moved intra-theater with C-130s and helicopters. MEADS will provide continuous coverage alone, or it will couple with SHORAD systems in the corps/ division area. It will use a netted and distributed architecture and modular, configurable battle elements, which allows it to integrate with other airborne and ground-based sensors to provide a robust, 360-degree defense.

Program Status. The FY04 -09 Plan currently funds completion of the risk-reduction effort and the start of the design and development (D&D) phase, including the development of prototype MEADS major end items. A production phase will follow D&D. A phased P3I program is being considered that will anticipate maintaining continuous overmatch against emerging threats.

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS)



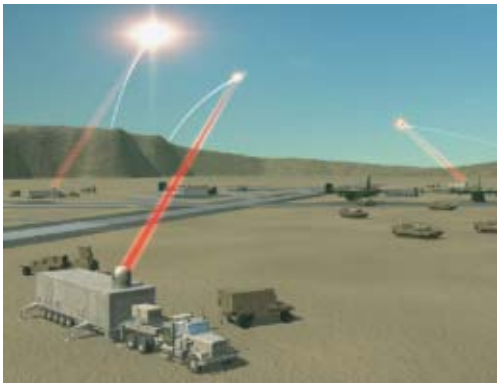
Description. JLENS is a theater-based system using advanced sensor and networking technologies to provide wide-area surveillance and precision tracking of land attack cruise missiles. JLENS is a joint program with Army lead. As a key element of the Single Integrated Air Picture (SIAP), JLENS integrates data from multiple sensors and C3I networks and provides correlated data to BMC4I nodes. JLENS consists of surveillance and fire control radars. JLENS provides over-the-horizon surveillance and precision track for broad area defense against land attack cruise missiles and low-flying threats. It also functions as a multi-purpose aerial platform to enable extended range C2 linkages. JLENS is less expensive to buy and operate than fixed wing aircraft and can stay aloft for up to 30 days, providing 24-hour battlespace coverage over extended areas.

Program Status. The program is currently in the concept and technology development phase of its life cycle.

Mobile Tactical High Energy Laser (MTHEL)

Description. MTHEL is a combined U.S. and Israeli program to develop a mobile High Energy Laser Weapon (HEL) system prototype that is capable of acquiring, tracking, engaging, negating and destroying short-range ballistic

missiles (SRBM), rocket, artillery and mortar (RAM) threats, UAVs, cruise missiles, and air-to-surface munitions. In the near term, MTHEL will use Deuterium Fluoride (DF) chemical laser technologies to provide cost-effective kills while the solid-state laser technologies mature. The MTHEL system will be capable of being integrated into existing air defense architectures.



Program Status. The FY04-09 Plan funds the development of system technical requirements, extended lethality testing, and risk reduction to support a Concept Design Review decision in FY03. The program will then enter a System Development and Demonstration (SDD)-like phase to design, fabricate, integrate, and test up to two prototypes by 3QFY07.

AMD Summary

AMD modernization is on track to meet Army Transformation requirements and provide a multi-tiered capability able to defeat a significant and advancing threat. Current resources are being focused on those capabilities that are time-critical in accordance with the *Army Transformation Roadmap* and that provide the greatest benefits to the force. To ensure effective balance, AMD modernization remains closely synchronized with other Joint Theater Air and Missile Defense elements to provide effective support for all critical operational goals.

Chemical, Biological, Radiological, and Nuclear (CBRN) Defense Capabilities

CBRN systems provide the Army with the enabling technologies of CBRN defense, smoke and obscurants to fully achieve force protection, Information Dominance, and Full Dimensional Protection in a Weapons of Mass Destruction (WMD) environment. The Army's CBRN defense strategy is to employ "focused defense" against CBRN threats so that only units directly affected by the hazard would be warned to take protective measures. Using focused defense, large numbers of units will no longer assume a full protective posture as a precautionary measure. Focused defense allows units to operate in the lowest required protective posture without unacceptably increasing the risk to Soldiers.

In addition to providing the means of general CBRN defense to all units, the Army provides increased CBRN defense capability with specialized chemical units. CBRN reconnaissance and surveillance units, with their point and standoff detectors, are the principal means of contamination avoidance. Decontamination units restore combat power after units are contaminated. Biological detection companies provide shortened response times for divisions and corps to initiate their medical response to the growing threat of biological warfare agents.

The CBRN defense mission area also includes the Army's efforts to address homeland security. Today, the Nation is beginning to understand that CONUS installations and power projection platforms are no longer a sanctuary. The very ability to execute our force projection strategy requires CBRN-focused defense over strategic forces and the means to employ them from pre-mobilization through conflict termination and demobilization.

In providing CBRN defense for the Army's Transformation Strategy, the Army will equip its specialized chemical units and provide CBRN defense items common to all units in accordance with the three tenets of the Army's overall modernization strategy (1) focusing its science and technology (S&T) efforts on the Objective Force, (2) meeting immediate operational needs in the Interim Force, and (3) maintaining and improving the warfighting capabilities of the Legacy Force through a judicious combination of selected modernization, recapitalization, and sustained maintenance of legacy, but still essential systems. The following paragraphs will elaborate on some of the key CBRN systems in the Army's modernization plans, realizing there are numerous additional CBRN systems in development.

Discussion of Key Equipment

M93/M93A1 Nuclear Biological Chemical Reconnaissance System (Fox)

Description. The Nuclear, Biological and Chemical Reconnaissance System (NBCRS)-Fox Block I Modification (M93A1) contains an enhanced CBRN sensor suite consisting of the M21 Remote Sensing Chemical Agent Alarm (RSCAAL), MM1 Mobile Mass Spectrometer, Chemical Agent Monitor/Improved Chemical Agent Monitor (CAM/ICAM), AN/VDR-2 Beta Radiac, and M22 Automatic Chemical Agent Detector/Alarm (ACADA). The M93A1 Fox is also equipped with an advanced navigation system Global Positioning System (GPS) and Autonomous Navigation System (ANAV) that enable the system to accurately locate and report agent contamination. It has an over-pressure filtration system that fully protects the three-person crew.

Program Status. The FY 04-09 Plan funds complete fielding of planned systems through 4QFY03.

M31/M31A1/M31E2 Biological Integrated Detection System (BIDS)

Description. The BIDS consists of a shelter mounted on a dedicated vehicle (M1097A1 HMMWV) and equipped with a biological detection suite employing complementary technologies to detect large area biological attacks. It can detect all types of biological warfare (BW) agents in less than 10 minutes, and identify any 8 agents simultaneously in less than 30 minutes.

Program Status. The NDI version of the BIDS has been fielded to the 310th Chemical Company (Reserve) and the P3I version has been fielded to the 7th Chemical Company (Bio). Each company has 35 systems. The M31E2 version is completing final Operational Testing and will be fielded to the 375th Chemical Company (Reserve) starting in 4QFY03.

Stryker-Nuclear, Biological and Chemical Reconnaissance Vehicle (NBCRV)

Description. The Stryker-NBCRV will incorporate the Block II NBCRV integrated chemical and biological point detectors that will allow on-the-move standoff biological and chemical agent detection. The Chemical Biological Mass Spectrometer (CBMS) Block II will improve the detection and identification of liquid chemical agents while providing a first-time biological agent detection capability to the reconnaissance platform. The Block II sensor suite will automatically integrate contamination information with data from on-board navigation and meteorological systems and rapidly transmit contamination hazard and clear area intelligence to the appropriate operations center. Integration of the common CBRN technical architecture will allow for expansion/ upgrading of the on-board computers at minimal cost, as well as the command and control of CBRN-sensing UAVs and Unmanned Ground Vehicles (UGVs) in the Objective Force system.

Program Status. Stryker-NBCRV Milestone C is scheduled for 1QFY03 and will allow the start of LRIP. Production Verification Testing (PVT) and Initial Operational Test and Evaluation (IOT&E) are planned for FY03/04. The FY 04-09 Plan funds fielding of the Stryker NBCRV to all SBCTs.

Chemical Biological Protective Shelter (CBPS)

Description. CBPS replaces the M51 Collective Protection Shelter. It consists of a Lightweight Multi-purpose Shelter (LMS) mounted on an Expanded Capacity HMMWV variant (ECV) and a 300 square foot air beam supported soft shelter. CBPS provides a contamination free, environmentally controlled working area for medical, combat service, and combat service support personnel to obtain relief from the continuous need to wear chemical-biological protective clothing for 72 hours of operation. All ancillary equipment required to provide protection, except the generator, is mounted within the shelter.

Program Status. An urgency of need has been established for the CBPS due to very few serviceable M51 systems remaining in the inventory and limited procurement was authorized for up to 152 systems. A June 2002 MS III decision recommended approval for full production. First Unit Equipped (FUE) fielding to Level I and Level II medical units and Forward Surgical Teams is scheduled for January 2003.

The CBPS P3I program was initiated in FY02 to improve the current version of CBPS and develop versions suitable for forward deployed medical units within airborne/air assault and heavy divisions.

Collectively Protected Deployable Medical System (CP DEPMEDS)

Description. The CP DEPMEDS enables field combat support hospitals to sustain medical operations in a CB environment. The CP DEPMEDS will provide a clean, toxic free, environmentally controlled patient treatment area, maximizing the use of existing equipment to the Hospital Unit Base of fielded Deployable Medical Systems for the Army and to Air Transportable Hospitals for the Air Force. The program is a multi-service effort between the Army and Air Force. All services use field hospitals, which are comprised of the same building block components. Hospitals vary in size and configuration between the services. Collective protection is provided through the addition of M28 Collective Protection Equipment (CPE), CB protected environmental control units and heaters, CB protected latrines and water distribution systems; low-pressure alarms and other integration components necessary for a fully operational CB protected hospital facility. All components are designed to integrate into fielded hospitals. Components will be packaged as a set to be provided to units fielding to threat areas. The CP DEPMEDS is installed during set up of the hospital.

Program Status. The current approved Plan for FY04-09 supports procurement of 13 CP DEPMEDS and five CP DEPMEDS cold weather kits to sustain operations in cold climates. The CP DEPMEDS components being procured are necessary to provide a fully operational collective protection capability to fielded hospitals. The components are being packaged as a set that will be provided to hospitals deploying to a CB threat area. Five CP DEPMEDS will be pre-positioned to support rapid deployment and the remaining placed in Army War Reserve.

Sorbent Decontamination System, M100

Description. The M100 Sorbent Decontamination System (SDS) is intended to replace the M11 and M13 Decon Apparatuses Portable (DAP) currently employed in operators' spray down operations associated with immediate decontamination. The M100 SDS uses a reactive sorbent powder to remove chemical agent from surfaces. Use of the M100 SDS decreases decontamination time and eliminates the need for water.

Program Status. Currently being fielded to all users.

Joint Portal Shield Detector System (JPS)

Description. The Joint Portal Shield (JPS) is DoD's first automated networked biological detection systems. The system uses an innovative network of sensors to increase probability of detecting a BW attack while decreasing false alarms and consumables. The JPS system can detect and

presumptively identify up to eight BW agents simultaneously in less than 25 minutes.

Program Status. JPS operates in Korea and Southwest Asia. Twelve additional sites have been directed by the DEPSECDEF for Pacific Command and Central Command Combatant Commanders. The Defense Emergency Response Fund (DERF) funds the upgrade of 237 fielded Portal Shield units with Biological Aerosol Warning Sensor (BAWS). Fifty-four additional units will be procured as part of CB Installation Protection Equipment.

Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD)

Description. The JSLSCAD is a lightweight, passive, standoff, and chemical agent detector that is capable of providing up to 360-degrees on-the-move vapor detection from a variety of tactical and reconnaissance platforms at distances up to 5 km. Enhanced early warning for contamination avoidance is the competency of the system. When avoidance is not possible, JSLSCAD will provide extra time for warfighters to don full protective equipment .

Program Status. The JSLSCAD is in a five-year developmental effort that includes ground-, air- and sea-based platforms. Production is scheduled to start after Milestone III in 3QFY04. Three follow-on production options are planned: the first option is to refurbish the EMD test units; the second option is for initial production; the third option is for full-scale production.

Joint Service Light Weight NBC Recon System (JSLNBCRS)

Description. JLNBCRS provides point and standoff intelligence for real-time field assessment of NBC hazards. The system is a vehicle-mounted suite of equipment and software designed to detect, collect, analyze, mark, and disseminate NBC data.

Program Status. IOC is scheduled for 1QFY05.

Joint Chemical Agent Detector (JCAD)

Description. JCAD will be a combined portable monitoring and small point chemical agent detector for aircraft, shipboard, and individual Soldier applications. This hand-held, pocket-sized detector is required to automatically detect, identify, and quantify chemical agents.

Program Status. The contractor is currently building prototypes, which are in agent testing. LRIP (MS C) is planned for FY03.

Joint Warning and Reporting Network (JWARN)

Description. The JWARN consists of software and hardware components that link NBC

detectors to tactical communications for NBC warning, reporting, and battlefield management.

Program Status. Initial operating capability (IOC) (commercial off-the-shelf (COTS) NDI) was completed 4QFY99 and initial operating capability with Global Command and Control System (GCCS)-level C4ISR systems is scheduled for 3QFY04.

Joint Service General Purpose Mask (JSGPM)

Description. JSGPM is designed to replace the existing M40/M42/MCU-2/P series mask. It will significantly reduce mission degradation and will be compatible with future equipment and Soldier systems. JSGPM will increase the Soldier's ability to perform mission essential tasks because physiological burdens, such as breathing resistance, will be substantially reduced and the field of vision will be significantly improved. A key feature of the mask will be reduced weight and bulk.

Program Status. JSGPM replaces existing mask systems (M40/M42 and MCU-2/P series) at the end of their 10-15 year service life. Fielding is slated for 4QFY06.

CBRN Summary

Among the significant changes to the future strategic environment, proliferation of WMD is recognized as a principal asymmetric threat capable of providing an adversary military advantage to neutralize overwhelming conventional superiority. Having an effective CBRN defense is a necessary component of any defense strategy that seeks to demonstrate to the adversary that use of WMD will not gain the advantage sought. Modernizing the force while conducting a robust S&T effort is critical to preventing technological surprise from new CB agents or different employment means. Recapitalizing and maintaining the current force is necessary to enable Transformation and mitigates risk by extending the useful life of current systems within fiscal constraints. This Modernization Plan assures a disciplined approach to meeting mission-based requirements and secures orderly change as we transition to the Objective Force.

Appendix 2: Projecting and Sustaining U.S. Forces in Distant Anti-Access or Area Denial Environments and Defeating Anti-Access and Area Denial Threats.

While U.S. adversaries seek means to deny the Joint Force access to theaters of operation, the Army is working to assure it. The Army's foremost contribution to this goal is its ability to strategically deploy dominant land forces. Assured access, the requisite multidimensional solution to the anti-access challenge, has diplomatic, economic, informational, and military components as well as joint, interagency, and multinational aspects. As the major land power component of U.S. Joint Forces, the Army provides unique capabilities to gain, enhance, and maintain assured access. These capabilities are provided through core competencies, shaping

the security environment, executing prompt response, and forcible entry.

Assuring access and countering anti-access threats begins at the political level before a hint of crisis appears. From a military perspective, the global posture of engagement will determine whether a nascent crisis is addressed from a position of relative strength or weakness. Forward-deployed forces, prepositioned stocks, regional bases and facilities access, standing agreements with allies and other nations, regional engagement by SOF and conventional forces, and multinational exercises are instrumental in shaping a position of strength.

The essence of executing prompt response is providing strategically responsive forces that are mission-tailored and projected from home and abroad. The inherently capable Objective Force will conduct operational maneuver to achieve positional advantage from strategic distances as part of multidimensional joint operations. The ability of the United States to execute a prompt global response with decisive, full spectrum land forces will continue to require sufficient strategic mobility enablers and enhancements. These include force projection platforms, force projection technologies, and prepositioned stocks.

Ultimately, the United States must have confidence in its ability to respond militarily and win decisively, even in degraded access environments. Forces must close with and destroy enemy forces; apply precision fires and maneuver; exercise information superiority; integrate joint and multinational operations; and defend and control land, people, and resources at home and abroad. Army combat formations provide unique capabilities for forced entry operations. Forced entry capability will evolve from strategic strike and seizure operations, currently embodied in the Airborne Division and Ranger Units, to a more robust, full-spectrum capability. The Objective Force will deploy rapidly from multiple ports of embarkation, at home or abroad, to multiple points within the theater of operations and fight upon arrival, bypassing chokepoints and anti-access threats as necessary. The Army's capability for sustained, decisive operations is evolving from a concept of linear, sequential operations using the alert-train-deploy-buildup-counterattack paradigm embodied in our Legacy Corps and Division structures. The new paradigm is a capabilities-based, fully networked force designed and able to conduct simultaneous, distributed operations using a train-alert-deploy-fight paradigm. Logistics capabilities that are evolving from inventory-based processes and systems to a more streamlined and responsive distribution-based system will sustain the fully networked force. Additionally, Army forces provide unique missile warning and missile defense capabilities critical to countering specific anti-access threats and enhancing assured access through systems such as the Patriot/PAC-3. Army formations also conduct sustainment operations in support of Army and other Joint Force elements.

Defeating Anti-Access and Area Denial Efforts with Improved Ground Force Combat Capabilities

The central responsibility of the Army under Title 10, USC, is to conduct prompt and sustained operations on land as a component of the Joint Force. Fulfilling this responsibility rests, to a very large extent, on the Army's ability to rapidly project lethal, survivable and sustainable combat power as part of the joint force. Many of the joint forces' current power projection (P2) capabilities are still designed for the Cold War era and are not sufficient to satisfy the current and future operating environment's demand for a more strategically responsive ground force

that is capable of defeating anti-access and area denial efforts. Significant P2 improvements are required for the Army to fulfill its central mission of prompt and sustained operations. P2 improvements should be balanced across the three major components of force deployment:

1. The deployment process itself.

2. The strategic and intra-theater lift capabilities provided by both the Army and the other Services (including airlift, sealift and prepositioning).

3. Improved force design and structure.

Appendix 2 of this annex will primarily focus on the materiel programs associated with the deployment process, improvements in lift, and the key platforms and systems associated with the Army's new force designs: the Interim and Objective Forces. Since the Army's Legacy Forces will continue to play a significant role in the Nation's defense for many years to come, this annex will also discuss key programs for the Army's light and early entry forces which provide the forcible entry capability needed to overcome the enemy's anti-access and area denial efforts. Sustainment of forces, in any environment, is critical to successful mission accomplishment, and some of those systems that enhance the Army's battlefield logistics efforts are also include in this appendix. Finally, as part of reviewing selected key ground combat force systems within the context of overcoming enemy efforts to preclude access, this appendix will also highlight some of the ground combat engineering systems, which provide assured access for Army forces.

Improving the Deployment Process

While the Army is clearly focused on transforming itself to an Objective Force design, P2 enhancements are required now and need not be tied to the development of an Objective Force capability. The Army currently has a number of automation systems, each with a joint foundation, that are designed to assist in the overall command, control, movement, and tracking of personnel and equipment. Improving the process also requires the Army to establish a first-rate deployment training program that routinely uses wartime processes in building unit load plans and deployment lists, and trains and exercises personnel on the identification, marking, and tagging of equipment.

Today's process of entering deployment data into the defense tracking system is lengthy, complex, and inimical to the prompt deployment and sustainment of the force. It is an installation-based process carried out by part-time unit movement officers who create and process unit movement data in a centralized manner at computers located at the installation level in response to telephonic requirements. The process is transitioning, however, to a commander-centric one through the emergence of systems such as the Transportation Coordinators Automated Information for Movement System II (TC-AIMS II), where unclassified time-phased deployment data will be distributed down to the deploying units for their update with precise deployment data.

The importance of transmitting accurate deployment data quickly cannot be overemphasized. Not only does this data serve as a measure for deployment feasibility assessments, it assures that correct lift is assigned. It also serves as the basis of force integration by the Joint Force Commander in overseas joint areas of operation. In turn, this integration is the foundation of effective command and control of the deployment operation. Consequently, integrated forces can

be employed immediately upon their arrival to exploit time-sensitive enemy weaknesses.

Discussion of Key Equipment

Global Command and Control System-Army (GCCS-A)

Description. GCCS-A provides critical automated tools for the Army theater commanders to enhance warfighter capabilities throughout the spectrum of conflict during joint and combined operations. GCCS-A is the strategic command and control system that provides readiness reporting, mobilization, and deployment of Active, Guard and Reserve Forces. This system also provides the theater commander with detailed information on intra-theater planning and movement. A more detailed description of GCCS-A is provided in Appendix 6 of this annex.

Global Combat Support System-Army (GCSS-A) and the Logistics Modernization Program (LMP)

Description. GCSS-A is the Army's primary enabler for combat service support (CSS) transformation and supports the functions of manning, arming, fixing, fueling, moving and sustaining Soldiers and their systems. It will be integrated with the LMP (National level) to provide a seamless enterprise-wide logistics environment spanning factory to foxhole. Both LMP and GCSS-A feature centralized total asset visibility, distribution based supply, enterprise-wide maintenance data, and near real-time logistics readiness information. Improved software will achieve CSS integration that is currently lacking in the Army's present business systems/processes. Most importantly, the modernization is targeted to improve business operations up and down the supply chain while providing the capabilities to meet the Objective Force CSS objectives. For example, the GCSS-A will extend to the platform level of the Future Combat System (FCS) for management and delivery of CSS over the extended battlespace.

Program Status. The LMP is well underway and due for completion in FY04. GCSS-A will commence in 3Q FY03 with implementation beginning in FY06 and ending in FY08.

Transportation Coordinators' Automated Information for Movement System II (TC-AIMS II).

Description. TC-AIMS II is a Logistics Transformation enabler that establishes the baseline for the deployment infrastructure needed to meet Objective Force deployment objectives. The Army has Service lead for the development of this joint system, which addresses critical shortfalls in the movement of materiel and personnel in support of DoD operations and the Joint Deployment Process. CJCSI 3020.01 directs the Services to field TC-AIMS II to their early deploying units by the end of FY03. TC-AIMS II merges the best business practices of the current Service-unique transportation automated information systems into a single system that combines the requirements for Unit Movement, Installation Transportation Office/Transportation Management Office, and Theater Distribution functional areas as well as integrating several legacy systems of each of the four Services. TC AIMS II improves joint capabilities for rapid worldwide deployment, and redeployment, and enables individual units the autonomous capability to conduct rapid crisis response at Unit of Action level. Each battalion and separate company will be trained on TC-AIMS II and provided with a complete suite of computer hardware.

Program Status. The TC-AIMS II program has been segmented into 7 blocks of requirements that support a spiral software development strategy. TC-AIMS II has been fielded to USAREUR and is currently being fielded to FORSCOM and the U.S. Navy. Full Operational Capability (FOC) will be fielded to all Services by FY09.

Movement Tracking System (MTS)

Description. MTS is a critical Logistics Transformation enabler that provides visibility for the Joint Logistics Corporate Enterprise and enables Distribution Based Logistics. MTS provides asset visibility and situational awareness that assists Combat Support/ Combat Service Support (CS/CSS) commanders and their staffs in planning and executing CS/CSS operations. It also provides commanders and their staffs the capability to identify and track positions, monitor progress and communicate with tactical wheeled vehicles supporting CS/CSS operations. MTS allows for continuous CS/CSS asset visibility across the tactical area of operations. MTS is a satellite-based tracking/communications system consisting of mobile unit transceivers, system control stations, global positioning systems, common operating software and MTS unique software.

Program Status. MTS is in full production. Fielding began with III Corps in 2001. Fielding will continue through 2022 at current funding levels.

Enhanced Lift Capabilities

Extensive analysis and wargaming has shown that both current as well as many planned strategic and intra-theater air and sealift platforms do not support future warfighting concepts. Many current sealift platforms require deep-water ports to berth and off load. The availability of such ports is limited geographically to industrial nations and they are conspicuously absent in most nations south of the equator. Further, the limited number of these ports lends to many anti-access measures and jeopardizes the deployment of the joint warfighting force. Advanced sealift capabilities that provide for brownwater and over-the-horizon sealift are critical to support efforts designed to defeat anti-access and area denial methods. High-speed, shallow draft vessels can leverage numerous ports in all areas of the world and supports the concept of multiple, parallel seaports of debarkation (SPOD) which is fundamental in overcoming anti access challenges.

Existing strategic air platforms such as the C-5 Galaxy can carry enormous loads but are dependent on world-class airports for both embarkation and debarkation. The C-17 and C-130 provide the only capability today of bypassing these major choke points from appreciable distances while maximizing load capacities. Even so, they are still constrained to at least a 3,000 foot runway and in many cases (weather, terrain, and environment dependent) may require 5,000 - 6,000 feet with sizeable loads. The venerable C-130 is further hampered by significant payload, altitude, and range limitations and cannot be refueled in air. These capability limitations not only severely constrain our ability to execute assured access strategies, they demand a nearby intermediate staging base to transload equipment, personnel and sustainment from inter- to intra-theater lift platforms. None of the airlift platforms are suitable for air sustainment, nor can they support rapid shift of maneuver forces and sustainment across the breadth and depth of the battlespace.

To overcome the limitations of these legacy systems, larger capacity Super Short Take Off

and Landing (SSTOL) and/or Heavy Lift Vertical Take Off and Landing (HLVTOL) platforms are required in substantial quantities for air movement of the Objective Force. Shallow draft high-speed sealift and advanced, intra-theater sealift designs are required for austere seaport access. Whether the goals encompass operational maneuver from strategic distances, use of multiple simultaneous austere points of entry, vertical maneuver and envelopment, dominant maneuver, precision engagement and focused logistics, SSTOL and HLVTOL technology solutions are needed sooner rather than later. These kinds of platforms further provide a quality of versatility and adaptability necessary to enable Army and Joint Force Commanders to adjust movement of forces and sustainment in stride in response to the evolution of the campaign and the enemy's own actions.

Funding the S&T and procurement required to bring advanced lift capabilities to the joint force is a joint challenge. The Army alone cannot develop, procure and field such systems due to both budgetary and regulatory constraints. Instead, the Army encourages joint S&T emphasis on the following efforts.

Shallow Draft High Speed Ship (SDHSS). An SDHSS is a strategic ship that can deliver troops, equipment, and sustainment together in sufficient size and at a considerable speed to provide immediate combat power to the Joint Force Commander. Because it has a shallow draft feature, it can bypass established seaports and discharge its combat power wherever there is at least a 10-foot draft and an acceptable offload site. With a C4I suite onboard, commanders can conduct en route planning, receive intelligence updates, and integrate with the Joint Force Commander.

Super Short Takeoff and Landing (SSTOL) Aircraft. The SSTOL is a joint aircraft with the ability to carry two FCS platforms 3,500 miles. It can land on 750 feet of road or field in the joint area of operations, which avoids fixed airfields and adds innumerable points of entry. It provides the Joint Commander the ability to achieve operational surprise.

Heavy Lift Vertical Takeoff and Landing (HLVTOL) Aircraft. The HLVTOL is an aircraft with the ability to deliver one FCS within a radius of 1,000 miles. The ability to insert combat vehicles vertically gives the commander unparalleled speed and agility. Generally independent of ground conditions, it enables the Joint Force Commander to conduct vertical envelopment and vertical maneuver, as well as the ability to avoid predictable, linear patterns of operation. It also offers significant benefits to vertical joint logistics over-the-shore.

Theater Support Vessel (TSV). The TSV is the operational version of the strategic SDHSS. It is another source of flexibility and agility within a theater as it allows the Joint Force Commander to insert combat power and sustainment into austere ports worldwide. Supporting Army Prepositioning Stocks and Joint Logistics Over The Shore (JLOTS), the TSV expands the reach and possibilities of both land-based and afloat prepositioning.

Discussion of Key Equipment-Lift and Sustainment Capabilities

Theater Support Vessel (TSV)

Description. The TSV is a high-speed, 40+ knots, shallow draft sealift platform that will maximize COTS ferry technology currently in use in civilian markets. The TSV provides the capability to conduct operational maneuver and repositioning of intact unit sets while conducting En route Mission Planning and Rehearsal

(EMPR). This intra-theater vessel provides the Combatant Commander with increased throughput, increased survivability, increased responsiveness, and improved closure rates. This transport transformation enabler helps obtain Objective Force deployment goals as well as achieving full distribution-based logistics.

Program Status. Two vessels are being leased for testing purposes to refine and update the ORD. The first vessel, Joint Venture, HSV-X1, is shared with the Navy through FY03. The second vessel, Spearhead, TSV-1X, has been nominated the ACTD vessel and will perform test and evaluation activities in support of current operations.

Precision, Extended Glide Airdrop System (PEGASYS)

Description. PEGASYS is a high-altitude-capable, autonomously operated precision airdrop system. The system consists of a family of differently sized airfoils, allowing airdrop of weight categories up to approximately 42,000 lbs. PEGASYS is not totally wind dependent and is releasable from altitudes up to approximately 35,000 feet Mean Sea Level (MSL). Based upon winds and release altitude, 50 km standoff distances are also possible. Space-based GPS technology provides for aerial navigation/maneuverability throughout descent, steering into the wind as necessary, and permitting highly accurate ground touchdown locations. PEGASYS is a critical logistics transformation enabler that facilitates dedicated aerial sustainment and helps achieve full distribution-based logistics.

Program Status. The PEGASYS ORD is in development and will be modified as needed during the upcoming ACTD. The ACTD will procure three to five each of the candidate prototypes for use in the operational demonstration, mature them to a level suitable for operational use, and assure interoperability and interfacing and communication.

Improving Army Force Design and Structure

As stated earlier in this Modernization Plan, the 96/120-hour and 30-day metrics established by the Army Vision correspond appropriately to two significantly different requirements, the first to respond promptly to deter and provide immediately employable, strategically responsive ground forces, the second to achieve deployment momentum through the uninterrupted introduction of large forces for sustained operations. These metrics clearly have value as a force sizing/design metric. However, the operational significance of the metrics may also be interpreted in terms of the arrival and employment of required capabilities. In fact, in many circumstances, the capability to initiate and sustain effective operations rather than to "close" a force structure will likely be more meaningful. While a detailed discussion of this aspect is beyond the scope of the Modernization Plan, it should be noted that one of the most important insights emerging from current analysis and wargaming is that the entire closure of deploying force

structures is not a rigid prerequisite for employment of arriving forces. The essential parameter appears to be the arrival of integrated combat power sufficient to initiate and sustain effective operations. For example, in many conceivable contingencies, such as a noncombatant evacuation operation, requiring promptly deployed forces, a two battalion force from a brigade under brigade C2 may be sufficient to successfully begin and continue operations while the entire force continued its deployment. Recent wargaming results suggest that 80 percent of force structure may be an appropriate threshold, although contingency circumstances and the judgment of the commander will remain central.

As the Army continues to refine Objective Force design and model its capabilities vis a vis the 96/120/30 metrics, the most appropriate threshold for effective employment will become clearer. Regardless, it is apparent now that the size and composition of the Objective Force, particularly its modularity and reduced cube and weight, coupled with its C4ISR capability and enabled by agile lift, create a dramatically flexible force that can be deployed faster and sustained for longer periods of time. The force will be able to adjust its destination and mission in stride and thereby provide the Joint Force Commander unprecedented possibility to achieve operational surprise with a ground force.

Discussion of Key Equipment

Facilitating the development of a lighter, more agile—yet more lethal and survivable force—has been the Army's intent in using common chassis for future warfighting platforms that fit the "C-130 envelope" and generally weigh less than 20 tons. This effort began with the development of the Army's Interim Force and will continue forward with the Objective Force. The platforms associated with these efforts are the Stryker and the FCS.

Stryker Family of Armored Vehicles

Description. The Stryker Family of Armored Vehicles is the centerpiece combat and combat support platform for the SBCTs. Two variants of the Stryker will be fielded: the Mobile Gun System (MGS) and the Infantry Carrier Vehicle (ICV). There will be eight additional configurations of the ICV: Reconnaissance Vehicle (RU), Mortar Carrier (MC), Commander Vehicle (CV), Fire Support Vehicle (FSV), Engineer Squad Vehicle (ESV), Medical Evacuation Vehicle (EMV), Antitank Guided Missile Vehicle (ATGM), and Nuclear, Biological and Chemical Reconnaissance Vehicle (NBCRV). Stryker capabilities include:

- Strategically responsive and deployable on the U.S. Air Force family of tactical aircraft.
- Roll-on/roll-off combat capable with minimum preparation.
- Superior situational awareness with internetted communications.
- Survivability enhanced by all around 14.5mm armor piercing and 152mm artillery airburst protection (add-on armor provides protection against rocket-propelled grenades (RPG) anti-tank weapons).

- Accurate target acquisition with Long Range Advanced Scout Surveillance System (LRAS3) mission package.

- Accurate target engagement with Remote Weapon Station (Mk 19 grenade launcher and M2 .50 caliber machine gun).

- Decisive offensive action with dismounted infantry assault (ICV).

- Bunker-busting capability with 105mm cannon (MGS) for roles in immediate fire support of dismounted infantry operations.

- Responsive indirect fires with 120mm mortar (MC).

- Anti-tank capability with TOW 2B (ATGM) and Javelin-equipped dismounted infantry (ICV).

- Mobility enhanced by mine plow, roller and detector (ESV).

- Integrated NBC sensor capability (NBCRV).

The Stryker provides a unique family of systems approach that maximizes commonality and integrated capabilities while filling an immediate capabilities gap in the current force. Supporting Stryker fielding is a complete new equipment training package for both operators and maintainers, provided at home station (currently being conducted at Fort Lewis, WA.)

Program Status. Planned procurement is for 2,121 vehicles consisting of two variants: Infantry Carrier Vehicle (ICV) with additional configurations and Mobile Gun System (MGS). The Army has fully funded the Stryker program to field six SBCTs, fulfilling the 1-4-2-1 defense construct and national security requirements. At this time, the Secretary of Defense has authorized the procurement of the first four brigades. The Army will provide the Secretary of Defense with a plan for Stryker Brigades 5 and 6. Specific units and conversion times are discussed in the main body of this Modernization Plan.

Future Combat Systems (FCS)

Description. The FCS is a networked system of systems that will serve as a core building block within all maneuver Unit of Action echelons of the Objective Force to develop the overmatching combat power, sustainability, agility, and versatility necessary for full-spectrum military operations. The FCS-equipped Unit of Action allows Soldiers to operate as a coordinated part of a distributed, networked force, enabling innovative operational behaviors and organizational structures. The FCS will provide the capability for Soldiers in the Objective Force to perform a wide range of military activities and operations, from small-scale contingencies to stability and support operations to major combat operations. The FCS operates as part of an overwhelmingly lethal, strategically deployable, self-sustaining, and survivable combat force.

The FCS leverages advanced technologies with the capability to incorporate future advances via a deliberate technology integration program of block improvements over time. An open architecture design concept enhances system versatility via an upgradeable and tailorable engineering approach that will support system-of-systems engagements in different missions as needed. The program uses high-payoff advanced technologies and techniques in areas such as survivability, lethal and nonlethal effects, supportability, propulsion, mobility, structures, robotics, human factors, training, and modeling and simulation. The combined approach of

innovation in operations and acquisition supports the fielding of FCS-equipped combat formations this decade and into the future.

The FCS provides a secure C4ISR system to harness advances in the distribution and effective use of information power. The FCS provides networked lethal direct fire, indirect fire, air defense, complementary nonlethal fires and effects, and troop transport capability. The FCS will consist of a combination of manned and unmanned air and ground elements.

Operational Requirement. The Operational Requirements Document (ORD) are in the process of being finalized. The Army Requirement Oversight Council (AROC) approved the Mission Needs Statement (MNS) on 31 October 2002; it will be presented to the Joint Requirements Oversight Council (JROC) in the second quarter FY03. The ORD has been received by the Army staff and will be submitted to the AROC in the second quarter FY03 and the JROC in the third quarter FY03. The FCS-equipped Unit of Action (brigade-like unit) is the networked system of systems that will serve as the core building block within modular maneuver echelons to develop overmatching combat power, sustainability, agility, lethality, and versatility optimized for wider spectrum of missions and tasks against the full range of threats in any operating environment and in all weather and terrain. The FCS-equipped force must be enabled to see first, understand first, act first and finish decisively.

Program Status. In February 2000, the Army partnered with the Defense Advanced Research Projects Agency (DARPA) and established an aggressive, collaborative demonstration program. The Army budgeted funds for the DARPA/Army collaborative program, identified S&T programs that support the FCS initiative, and assigned an Army program manager to DARPA. In September 2001, the Army assigned total program management authority to the Program Executive Officer, Ground Combat Systems. In November 2001, DARPA released a draft solicitation to industry requesting proposals for a Lead Systems Integrator responsible to conclude the Concept and Technology Development phase by providing the systems architecture and material concept to meet required FCS capabilities and support feasibility demonstrations up to the Milestone B decision in the third quarter of FY03. The Lead Systems Integrator was selected in March 2002. It is a team led by Boeing and SAIC.

Forcible and Early Entry Operations

Both the current and future operational environments feature an enemy whose efforts to deny access to aerial ports of debarkation (APODs)/seaports of debarkation (SPODs) and lines of communication hinder the introduction of sea, air and land forces. Recent military action in Afghanistan highlighted the need to acquire land bases, air overflight routes and sea lanes from which to conduct offensive operations. One of the most significant events during the recent conflict was the use of Army Rangers to seize the Kandahar airfield in an attempt to destroy enemy forces and acquire key intelligence products and information. This dramatic airborne assault validated the enduring requirement for forced-entry operations where anti-access and area denial efforts are confronted head on with a direct, joint force and combined arms assault on enemy forces featuring vertical envelopment—airborne operations—by small infantry units that, upon landing, immediately conduct a dismounted infantry assault against the enemy.

Forcible entry capability exists today with the Army's Legacy Force. The example cited above highlights the capability afforded by Army Ranger units. Other Army units, such as the 82d Airborne Division, are also capable of conducting forcible entry. As the Army transforms to an Objective Force, it recognizes the need to maintain this capability and, as part of this recognition, fully intends to maintain a vertical envelopment capability with selected Objective Force Units of Action as well as an inherent, organic forcible entry capability with all Units of Action.

The Objective Force will conduct CONUS-based forcible entry operations (mounted and dismounted) using strategic and theater assets (air and sea lift, remote precision fires, joint C4ISR, and other enablers) during any phase of the joint campaign. Forces also conduct forcible entry from initial staging bases (ISBs) or forward-operating bases over operational distances using power projection capabilities (HLVTOL or SSTOL), supplemented by joint lift and enablers. As part of this operation, UAs will arrive into the joint area of operation by insertion into multiple small airfields and other landing sites not easily predictable by the enemy in order to overcome his access denial strategy. Upon arrival, subunits will be ready to fight as coherent combined arms teams with mission support enablers: all crews, squads, and fighting or turret loads having deployed with their respective platforms. Once entry is assured, the joint commander will orchestrate the flow to build mobile, lethal capability quickly and evenly to prevent gaps between early arriving forces and counter-offensive/decisive operations forces (within the 30-day deployment goal).

Discussion of Key Equipment

Below are selected missile systems that provide infantry forces, particularly light forces that are force-entry capable, with the firepower and lethality they require to destroy armor and other hard targets. The systems listed below have varying applicability to Legacy, Interim and Objective Forces. Additional discussion on major combat systems, Soldier modernization and infantry weapon systems is found in the following appendix (Appendix 3) to this annex.

Infantry Close Combat Anti-Tank Missile Systems

Description. The Army continues to improve the Anti-tank (AT) lethality and survivability of its light and early entry forces through implementation of several key equipping and force structure initiatives.

Chemical Energy Missiles

The **Javelin** missile provides our dismounted infantry a highly formidable medium anti-tank capability for the dismounted close fight. As a

fire-and-forget missile with top and direct attack modes and 2.5 times the range, Javelin is a leap-ahead improvement over Dragon. Moreover, the Javelin's Command Launch Unit (CLU) greatly improves battlefield surveillance and survivability. Javelin has won high praise from commanders engaged in combat operations in support of Operation Enduring Freedom. Lessons learned from these operations are shaping the Javelin P3I program.

The **TOW 2B** missile will continue to sustain the heavy AT missile lethality of our TOW-equipped Legacy and SBCT forces. The TOW 2B missile is the most modern, capable missile in the TOW family. It is a fly-over, shoot-down version missile optimized for performance against tanks. The **Modernized TOW 2B** missile will provide even greater range and countermeasure defeat to TOW-equipped units and will mitigate TOW inventory risk.

Kinetic Energy Missiles

The Army is currently developing two kinetic energy missiles: **Line-of-Sight Anti-Tank (LOSAT)** and the **Compact Kinetic Energy**

Missile (CKEM). CKEM is an anti-armor weapon system that will be approximately half the size and weight of the current generation LOSAT missile. CKEM is being considered for use against enemy armor and other hardened targets at ranges to 5 km and greater. Capabilities will include: auto tracking of targets, overmatch lethality against projected threat systems to include those using explosive reactive armor active protection systems, and a system ability to engage three targets within ten seconds. The system launcher will slew to target, track the missile and target during missile flight and provide missile command guidance updates to the missile. The system is currently in concept design with developmental flight tests scheduled for FY 03.

LOSAT represents an earlier generation of kinetic energy missiles. The FY04-09 Plan funds development and procurement of LOSAT battalions for the Army's Light, Airborne and Air Assault Divisions. The lethality provided by LOSAT greatly increases the anti-tank capability of these forces.

Assuring Access and Sustainment During Operations

Entry operations—forced, semi-permissive or permissive—must be sustained, particularly while in the decisive phase. A critical factor in sustaining operations is the ability of forces to move and to properly maneuver over the depth and breadth of the battlefield while impeding/slowing/blocking our enemy's movement. Operation Enduring Freedom highlighted the enduring importance of systems that provide ground forces the capability of detecting, defeating, and emplacing minefields and other obstacle effects allowing unparalleled freedom of maneuver. This capability allows the Army to realize its vision through Transformation and preparedness to fight and win conflicts facing numerically superior foes with smaller more lethal, highly competent forces.

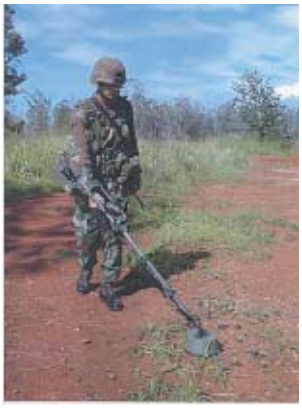
Army forces must be sustainable across the spectrum of conflict. Sustainability requirements reflect the continuous, uninterrupted provision of combat service support to Army forces. A full spectrum Army will require a combat service support reach

capability that allows commanders to reduce stockpiles in theater while relying on technology to provide sustained velocity management and real time tracking of supplies and equipment.

Discussion of Key Assured Mobility and Sustainment Equipment

Handheld Standoff Mine Detection System (HSTAMIDS)

Description. HSTAMIDS is a handheld mine detector capable of detecting metallic and nonmetallic anti-tank (AT) and anti-personnel (AP) mines. This system combines the maturing technology of ground penetrating radar (GPR) and improved metal-detection (MD) to provide a high probability of detection (Pd) for both large and small metallic and non-metallic AT and AP mines. HSTAMIDS will significantly improve detection of the smaller, low-metal AP mines with a probability of detection for all mine types in excess of 95 percent.



Program Status. HSTAMIDS will begin Operational Testing (OT) in FY03 and production in FY04.

Ground Standoff Minefield Detection System (GSTAMIDS)

Description. GSTAMIDS Block 0 clears a 20 km route in 12 hours using a remote-operated detection vehicle, Mine Protected Clearance Vehicle (MPCV), and a towing vehicle with proofing trailers. GSTAMIDS Block 1 clears a 40 km route in 6 hours. The detection vehicle utilizes a multi-sensor mine detection suite consisting of Metal Detection, Ground Penetrating Radar (GPR), Quadruple Resonance (QR), and Infrared (IR) to locate all anti-tank mine types. The MPCV provides soldiers a blast-protected vehicle from which to remotely operate the lead detection vehicle and mine detection subsystems.

Program Status. GSTAMIDS Block 0 began production in FY02 with the purchase of the MPCVs. Purchase of the mine detection system will begin in FY04 after testing. GSTAMIDS Block 1 begins production in FY08.

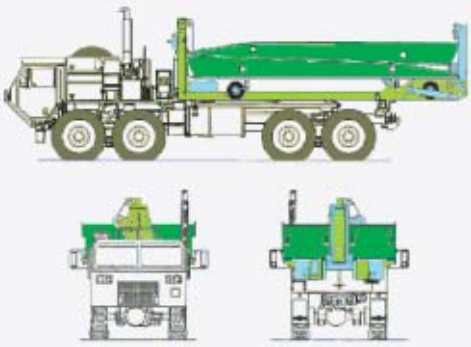
Improved Ribbon Bridge (IRB)

Description. The Improved Ribbon Bridge, fielded to Multi-Role Bridge Companies (MRBC), provides a continuous roadway or raft capable of crossing assault vehicles or tactical vehicles over non-fordable gaps. The capability of the bridge/raft system is Military Load Classification (MLC) 100 Wheeled and MLC 80 Tracked. The bridge sections are transported by Common Bridge Transporters (CBTs) providing enhanced mobility for site selection. Each MRBC will have the capability of 210 meters of bridging. The system is external airlift/transportable by CH-47 and CH-

53 helicopters. The bridge bays are air-transportable, partially disassembled in C-130s. The IRB has enhanced capabilities of negotiating current speeds up to 10.3 feet per second, 2.1 meter bank access, 4.5 meter roadway width, improved hydrostatic capabilities, and various other design improvements.

Program Status. A five-year multi-year contract was awarded in FY00 for 211 interior and 82 ramp bays and options for an additional 107 interior and 43 ramp bays. FUE scheduled for March 2003.

Rapidly Emplaced Bridge System (REBS)



Description. The REBS provides four meter roadway width, MLC 30 Tracked (T) and Wheeled (W) Normal and MLC 40(T)(W) Caution Crossings across 13-meter gaps for the SBCTs. Each SBCT is to be provided with four REBS. The system is external airlift/ transportable by CH-47 and CH-53 helicopters and C-130 aircraft. The REBS is operable by a crew of two soldiers with a daytime employment time of 10 minutes with little or no site preparation.

Program Status. A five-year multi-year contract was awarded in FY 01 for 18 systems and options for 22 systems. FUE is scheduled for the 1st Quarter FY04.

CH-47 Chinook

Description. The CH-47 Chinook is a twin-turbine, tandem-rotor, heavy-lift transport helicopter with a useful load of up to 25,000 pounds. The CH-47 modernization program will provide commanders a more reliable, less costly to operate aircraft compatible with Army digital connectivity requirements. Key modifications integrate an upgraded T55-GA-714A engine to improve performance capability, digital avionics, Air Warrior, emerging Global Air Traffic Management (GATM) requirements, enhanced air transportability, and an Extended Range Fuel System II (ERFS II) for self-deployment missions. It will also incorporate reliability and maintainability improvements to include airframe tuning for vibration reduction, corrosion protection, digital source collector, and recapitalization of 113 components. Currently there are 463 CH-47s in the inventory (429 CH-47D, 34 MH-47D/E). The current program recapitalizes 277 CH-47Ds and 34 Special Operations Aviation (ARSOA) MH-47s and converts an additional 26 CH-47Ds to the ARSOA MH-47 configuration. The decision on recapitalizing the remainder of the CH-47D fleet is dependent on funding and timelines for fielding the air maneuver and transport aircraft.

Program Status. In January 2003, the CH-47F program inducted the first CH-47D for initial low rate production of the CH-47F. Five

additional aircraft will be inducted by the end of August 2003. With the increase in MH-47 aircraft production of CH-47F, first unit equipped is now scheduled for the 4th quarter of FY07. Initial aircraft fielding is to the 160th SOAR (MH-47G), the 101 AA Division, and the XVIII Airborne Corps.

Family of Medium Tactical Vehicles (FMTV)

Description. The FMTV is built around a common chassis and drive train, featuring over 80 percent commonality of parts and components between models and weight classes. FMTV is a key enabler for Army Transformation. It provides unit mobility, resupply, and transportation at all organizational levels. It operates worldwide in all weather and terrain conditions. It serves as the weapon system platform for HIMARS and the resupply vehicle for Patriot. FMTV enhances crew survivability through the use of hardened cabs, three-point seat belts, central tire inflation, and machine gun ring mount capability. It provides enhanced tactical mobility and is strategically deployable in C-5, C-17, C-130, and C-141 aircraft. FMTV reduces the Army's log print by providing commonality of parts and components, reduced maintenance downtime, and lower operating and support costs than older trucks.

Program Status. FMTV is in full production and over 13,600 FMTVs were fielded as of 31 October 2001. A competitive multi-year rebuy contract is scheduled for award in March 2003.

Future Tactical Truck System (FTTS)

Description. The FTTS is envisioned as the Army's next generation tactical wheeled vehicle that provides direct support to Objective Force Units of Action in terms of command and control capability and transportation and distribution of cargo, equipment, and personnel. The FTTS-Maneuver Sustainment Vehicle will replace the PLS and HEMTT, and possibly selected FMTVs. The FTTS-Utility Vehicle will replace the HMMWV.

The FTTS will have improved range, cross country capability, reliability, ballistic protection, and integral cargo transport capability over current vehicles. The FTTS objective is to have as much commonality with FCS as possible to achieve the reduction in log print required for the Objective Force. This critical logistics transformation enabler provides commonality of platforms, helps reduce the sustainment footprint, and helps achieve full Distribution Based Logistics. The Army is in the process of conducting mission analysis and refining the capabilities documentation for this system.

Program Status. The Army has developed a joint, multinational FY05 ACTD concept for the FTTS that includes using FTTS maneuver and Sustainment Vehicle "like systems" and two FTTS Utility Vehicle "like systems" within an SBCT in a side-by-side demonstration with currently fielded vehicles. The purpose of the ACTD is to develop insights that will shorten the FTTS development time and permit accelerated fielding.

Maintenance Support Device (MSD) (Formerly the Soldier Portable On-System Repair Tool (SPORT))

Description. The MSD is a lightweight, rugged, portable tester employed at all levels of maintenance. It is the Army's standard at-system tester used to automatically diagnose weapon system operations, both electronic and automotive, and identify faulty components for immediate replacement. The MSD and its predecessor, the SPORT, are in wide use throughout the Army's ground combat and CSS vehicle fleets as well as in the Army aviation fleet.

Program Status. The MSD is currently in full rate production and fielding. A recent change in the basis of issue will provide the MSD to organizational level maintainers at a ratio of 1:3 per maintainer MOS.

Rough Terrain Container Handler (RTCH)

Description. The RTCH is the primary Material Handling Equipment capable of lifting standard 20 and 40-foot long International Standardization Organization (ISO) containers weighing up to 53,000 pounds. The RTCH can be operated on beaches, rough terrain, and unimproved surfaces. The system is air deployable and can be used to lift containers and prepositioned PLS flatracks, breakbulk cargo, and heavy palletized Class V loads (RTCH equipped with the forklift attachment).

Program Status. The RTCH is in full production. Fielding began in June 2001 at Fort Lewis to support the first SBCT.

Medical Communications for Combat Casualty Care (MC4)

Description. The MC4 system is a theater, automated Combat Health Support (CHS) system, which links commanders, health care providers, and medical support providers at all echelons with seamless, integrated medical information. It will receive, store, process, transmit, and report medical C2, medical surveillance, casualty movement/tracking, medical treatment, medical situational awareness, and medical logistics data across all levels of care. The MC4 is fully operational with standard Army systems and operates on standard Army hardware. MC4 is fully joint operations compatible and operates from a family of joint software. MC4 supports the commander with a streamlined personnel deployment system using digital medical information.

Program Status. MC4 has an approved ORD and is currently pre-Milestone B.

Unit Water Pod System (CAMEL)

Description. The CAMEL will be a 900-gallon capacity water pod with an integrated thermal-regulating module mounted on a FTTS version trailer. The CAMEL's integrated thermal-regulating module will prevent freezing during cold weather operations. It will also chill water during hot-weather operations in order to increase water palatability for the soldier. The CAMEL, when full, shall be capable of being

transported by C-130 and larger aircraft, external lift helicopter and be low-velocity air droppable. The CAMEL will have a filling stand for 5-gallon cans and canteens. It will replace the current special purpose water trailer, increase unit water storage, and decrease required spare parts.

Program Status. ORD was approved in March 2002 and Milestone B was successfully completed October 2002. Milestone C is currently scheduled for 4QFY03.

Load Handling System (LHS) Compatible Water Tankrack System (HIPPO)

Description. The HIPPO will consist of a 2000-gallon ISO-framed version of the Future Tactical Truck System with a compatible water tankrack with an organic 125 GPM water pump. The HIPPO will have a filling stand, a 35-foot hose reel, and bulk suction and discharge hoses. The HIPPO will enhance water distribution by providing one system that enables both hardwall bulk water transportation and unit retail water support. It will allow for water transport directly from water purification points to supported maneuver elements and can be used as a water distribution point.

Program Status. In September 2002, the HIPPO received Milestone C approval to purchase 5 low rate initial production units for testing.

Load Handling System Modular Fuel Farm (LMFF)

Description. The LMFF provides the ability to rapidly establish a fuel distribution and storage capability at any location regardless of the availability of construction equipment or material handling equipment. The LMFF consists of two different modules and a tankrack module. The modules of the LMFF can be recovered and moved by organic assets of the using unit. A version of the Future Tactical Truck System will be able to recover the tankracks and pump module, transport them to the new location, and emplace the system.

Program Status. The LMFF ORD was approved in March 2002; a Milestone C decision is scheduled for FY04, and SBCT fielding is scheduled for FY05.

Summary

This appendix focused on the materiel programs associated with deploying forces to theater and assuring their sustainment and mobility upon arrival. More important than materiel programs, however, is the entire re-design of the Army's force to an Objective Force design. This new design will greatly enhance the Army's ability to rapidly deploy and successfully carry out missions across the full spectrum of operations.

As the Army continues to transform itself into an Objective Force design, the specific requirements needed to enhance mobility and sustainability will become clearer. The current plan funds those programs with proven potential for the Objective Force and, where applicable, fielding to the Legacy and Interim Forces, with a follow-on track to Objective Force units.

The Army depends on a successful S&T effort to develop and begin fielding of the FCS by 2008 and encourages the other Services to invest S&T dollars on those systems that can enhance the strategic lift required to defeat enemy anti-access and area denial methods and techniques.

Appendix 3: Denying Enemies Sanctuary by Providing Persistent Surveillance, Tracking and Rapid Engagement with High-Volume Precision Strike, Through a Combination of Complementary Air and Ground Capabilities, Against Critical Mobile and Fixed Targets at Various Ranges and in all Weather and Terrain.

The DoD requires a broad range of strike capabilities across the full spectrum of conflict. Strike integrates dominant maneuver and precision engagement to defeat the adversary decisively. Maneuver is the ability to gain positional advantage with decisive speed and overwhelming operational tempo. Precision engagement involves the use of kinetic and non-kinetic weapons to inflict damage on, seize, or destroy an objective. The key element of strike operations is gaining positional advantage to improve the timeliness, range, precision, and impact on the target. The Joint Force, adept at overcoming anti-access and area denial strategies, attacking throughout the depth and breadth of the battlespace, and defeating fixed and mobile targets in all terrain and weather conditions, provides this capability. Strike operations with this Joint Force enhance precision engagement through full spectrum attack enabled by robust C4ISR and an enhanced suite of systems and munitions. Effective strike operations require maneuver of forces and precision engagement by these forces. The Army provides critical capabilities through its role as the dominant land power force for conducting full-spectrum, joint U.S. military operations.

Strike Operations and the Importance of Ground Force Maneuver

Both current and future operational environments will feature enemies who will avoid direct confrontation with U.S. forces whenever possible, unless it is to their advantage. The overwhelming combat power of our ground and air forces compels the enemy to seek ways of mitigating joint force capabilities. By hiding in mosques, churches, and hospitals, a tactic that enables him to "hug the innocents," the enemy creates a dilemma for the commander who must then discriminate among combatants and noncombatants. Dug-in, camouflaged, and concealed; in hardened positions, caves, and deep bunkers; masked by innocent populations to avoid either detection or attack by fires, our adversaries seek to evade precision fires and dominant battlespace understanding. Ground forces are often the only precise instruments that can attack these conflicted targets.

The Army solves this dilemma ,both today and in the future, by obtaining a positional and operational advantage over the enemy with ground maneuver forces. Effective employment of ground maneuver forces is highly dependent on assured mobility, without interruption or delay, to gain positional advantage to accomplish the mission. Persistent surveillance, tracking, and targeting of an enemy by technology-enabled forces are Army core competency requirements for units regardless of their size. A force with high volume precision organic fires and maneuver together with a JFC who possesses other precision engagement capabilities for the close fight, will compel the enemy to choose between two courses of action. Either he will flee his sanctuary or he will accept the risk of battle to avoid defeat in detail by an overwhelming maneuver force. In either case, enemy dislocation, disintegration, and

destruction are inevitable. The force of maneuver operations, in essence, "roots out" the enemy from his sanctuary and assures his destruction. The Army will accomplish this through the combination of maneuver and fires enabled by organic and joint ISR, and engagement capabilities.

Complementing its ability to maneuver forces once in a theater of operations, the Army provides—through forward basing and forward presence operations—immediate maneuver capability worldwide. This capability enhances forced and early-entry operations, typified by the current and ongoing operations in Afghanistan. Specifically, elements such as Ranger Units and the 82nd Airborne Division provide forcible entry and early-entry operations to expand control of key areas and prepare the way for follow-on forces. This provides robustness in precision engagement capability. The overseas presence of ground forces, combined with the capabilities of Army digitization, provide the capability for continuous and seamless "eyes" on the target and global reach, enhancing all aspects of precision engagement capability.

Precision Strike and Engagement Enhanced by the Soldier

Persistent surveillance and tracking of an enemy who seeks refuge in sanctuaries presents a tremendous challenge to joint air and ground forces. The Army uniquely contributes to this effort by providing "boots on the ground" with an organic precision effects capability. Employing land force provides additional magnitudes of precision, perhaps impossible by other means, and is particularly effective in demonstrating national resolve. At ranges of just inches to strategic distances on the battlefield, the Soldier functions in the role of a sensor, decision maker, shooter, and assessor.

The Soldier is the ultimate sensor. A Soldier observes, listens, feels, and processes information. He analyzes, judges, thinks, prioritizes, decides, and communicates what he knows and does so in real time. The Soldier is a shooter who designates, directs, or calls for precision engagement. He does this from inches to the limit of his technology-enhanced line of sight with his eyes, laser, or gun sight on the target, in all weather conditions and terrain sets. Most importantly, he is disciplined and trained, understands purpose and intent, and can assess, first hand, the battle damage and the effects of precision engagement. In effect, the Soldier is the ultimate precision weapon.

The Army has several programs designed to enable and enhance the Soldier's role in precision engagement. Underlying this program development is the concept of the "Soldier as a System." In this concept, the Soldier, analogous to a combat platform, has numerous component parts that must work in concert for full effectiveness. A central component of the "Soldier as a System" strategy is the Land Warrior (LW) program—a modular and C2 fighting system for infantry Soldiers that integrates many components and technologies into a lethal, survivable, mobile, and situationally aware Soldier system. The Army has successfully demonstrated the value of the Land Warrior system and is examining ways to accelerate its production and fielding. Of particular note, the accelerated fielding of critical equipment has enhanced the SOF role in Precision Engagement. For instance, to facilitate SOF operations, the Army is modernizing and equipping SOF aircraft with the Advanced Threat Infrared Counter Measures (ATIRCM) and the Army Suite of Integrated Radio Frequency Countermeasures (SIRFC). The Army believes that SOF modernization is among its highest equipping priorities, recognizing the critical role SOF forces conduct for the Joint Force Commander.

Discussion of Key Soldier Modernization Equipment

Soldier Modernization encompasses the integration of Soldier systems and equipment that consist of everything that is worn, carried, or consumed for individual use in a tactical environment.

The "Soldier as a System" is analogous to any other major weapon systems platform in that it has numerous component parts that must work in harmony to be effective. Yet, modernizing the Soldier is uniquely different from all other major weapon systems platform modernizations in two significant respects. First, the Soldier system frame is human; its loss is not measurable in dollars. Second, the Soldier is the common element for all Army major weapon systems platforms and the operation of every system is affected by the quality of the Soldier and the synergy created by his or her ability to interface effectively and efficiently with his or her equipment and systems. The Soldier modernization strategy provides for integrated Soldier systems to enhance the Soldier's capabilities in the near term. S&T followed by technology insertion will equip the Objective Force Soldier with the capabilities essential for full-spectrum dominance. With the Soldier as the critical link to success in the patterns of operation, enhancing Soldier combat effectiveness through improvements in warfighting capabilities is imperative to future mission success and transforming the Soldier who will remain the heart of the Objective Force.

The Soldier modernization process is accomplished through the use of one of three Soldier system development paths: the Soldier Enhancement Program (SEP), the Clothing and Individual Equipment (CIE) program, and the Warrior Programs (represented by Land Warrior, Mounted Warrior, and Air Warrior). The SEP (Marines participate through the Marine Enhancement Program (MEP) requires minimal Research, Development, Test, and Evaluation (RDTE) effort and shortens the developmental phase of the life cycle process through the use of COTS items with a goal of three years to fielding to Soldiers. The CIE program encompasses all combat, life support, ballistic, and environmental protection items worn or carried by the Soldiers for individual use that have not already been addressed under the SEP program. Central Funding and Fielding (CFF) is the procurement mechanism that acquires and fields life-support and mission enhancing equipment to individual Soldiers. CFF has been the mechanism used to field items developed by the SEP program and the Organizational Clothing and Individual Equipment (OCIE) RDTE process. The intent is to field these items within a three-year period after RDTE is completed.

Land Warrior (LW)

Description. LW is a first-generation, modular, integrated fighting and C2 system for infantry Soldiers and leaders that integrates many components and technologies into a lethal, survivable, mobile, and more situationally-aware Soldier system. LW systems/ components include a modular weapon system with thermal weapon sight, multi-functional laser with digital compass, video camera, and close combat optic; integrated headgear with helmet-mounted display and image intensifier; enhancements to protective clothing and individual equipment; and integrated individual Soldier computer/radio/GPS. The systems approach optimizes and integrates these capabilities, to include interface with the Army Tactical Internet, without adding to the Soldier's combat load or logistical footprint. Land Warrior Block II focuses on a dismounted/ mounted interface to fully synchronize combined arms operations. S&T advanced

technology components in areas such as enhanced navigation, system voice control, weight reduction, digital connectivity, and power will be technically inserted over time to meet objective requirements.

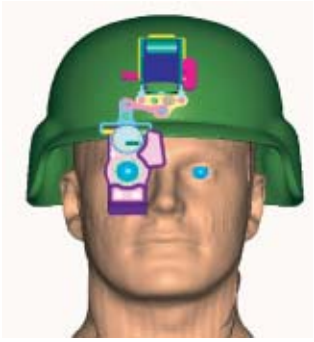
Program Status. The Land Warrior program has entered Developmental Testing (DT) and is expected to complete Operational Testing (OT) by the end of FY03. The current system is in compliance with all key performance parameters (KPP) for the LW initial capability (IC) increment, which is programmed for fielding to the Ranger Regiment. FUE is scheduled for 4QFY04, with the Rangers achieving Initial Operational Capability by the end of FY05. Fielding of the LW-Stryker interoperable capability, (SI) version, increment will immediately follow, with completion of the six SBCTs by the end of FY08. In addition to Stryker connectivity and integration, LW-Stryker upgrades will include combat identification, weight reduction, and increased power duration. The Objective Force Warrior Science and Technology program will develop technologies that will transition to the Land Warrior Advanced Capability development.

Air Warrior

Description. Air Warrior is a Soldier system for helicopter crewmen that provides integrated, modular life support equipment and chemical/biological protection, and reduced weight/bulk. Air Warrior significantly improves flight time in MOPP 4 gear from 1.6 hours to 5.3 hours. Air Warrior systems/components include a Microclimate Cooling System (MCS), a Survival Equipment Subsystem, a Modular Integrated Helmet Display System (MIHDS), an Over Water Survival Subsystem, NBC protection, and aviation clothing items. The MCS includes a Microclimate Cooling Undergarment (MCU) and a small Microclimate Cooling Unit (MCU) that chills water and pumps it through small tubes embedded in the MCU. The Survival Equipment Subsystem includes a survival gear carrier, soft and hard body armor, M9 9mm defensive weapon in thigh holster, PRC90/PRC112 radios and survival knife in ankle sheath. The MIHDS includes laser eye protection and a night vision device mount. The Over Water Survival Subsystem includes personal flotation device and an inflatable raft (LRU-18U). NBC protection includes a Modified Chemical Protective Undergarment, M45 or M48 protective mask, gloves and overboots. Aviation clothing items include modified ABDUs and the Aircrew Cold Weather System. The Air Warrior is a new generation of integrated, mission-tailorable, combat-effective life support equipment designed to improve aircrew endurance, mobility, and performance.

Program Status. The Air Warrior program has completed Operational Testing (OT) and is awarding production contracts in 2nd and 3rd Quarter FY03. Air Warrior will begin fielding in FY04 to the 160th SOAR(A).

Enhanced Night Vision Goggles (ENVG)



Description. The next generation of night vision goggles for the Soldier is the ENVG, which combines both an uncooled thermal and an image-intensification (I2) capability into a single device. The ENVG will provide Soldiers with the ability to engage and execute close combat in all levels of light, to

include the zero illumination condition found in caves and underground environments, adverse weather conditions and under battlefield obscurant conditions.

Program Status. This program is in Concept and Technology Development with a Milestone B decision in early FY04. MS C decision is anticipated in late FY05 with production beginning in FY06.

Thermal Weapons Sights (TWS)

Description. TWS are a family of low-cost, lightweight, man portable infrared imaging devices of high resolution to be used for surveillance and fire control of individual and crew served weapons during both daylight and darkness. TWS operate in adverse weather and dirty battlefield scenarios including light foliage, smoke, dust, and camouflage and will be fielded to Legacy, Interim and Objective Forces. This is a Land Warrior system.

Program Status. TWS has completed both its SDD and IOTE phases. Final test results are pending and full material release is imminent. Fielding should begin in 1QFY03.

XM29 Rifle, Integrated Airburst Weapon System (formerly the Objective Individual Combat Weapon (OICW))

Description. The XM29 Rifle, Integrated Air Burst Weapons System, is under consideration to replace selected M16 rifles and M4 carbines. The modular, dual-barrel XM29 will combine the lethality of 20mm High Explosive Air Burst munitions and 5.56mm NATO ammunition with a full-solution fire control to decisively effect violent and suppressive target results and to greatly improve small arms performance. This fire control will incorporate a laser range finder, ballistic processor, direct view optics, electronic compass (bearing, tilt, cant), thermal sighting and an internal display. The XM29 will be compatible with the digital battlefield and will provide the lethality upgrade for the Land Warrior. The Army is still conducting mission analysis and completing capabilities documentation for this system.

Program Status. The XM29 is an ACAT II "major system" program currently in System Development and Demonstration. Milestone C is slated for FY07 with a FUE of FY08.

XM307 (formerly the Objective Crew Served Weapons (OCSW))

Description. The XM307 is a lightweight two-man portable machine gun, which will replace selected M2 and MK19 Grenade Machine Guns. The weapon weighs approximately 50.3 lbs and is capable of firing 25mm air-bursting munitions designed to defeat defilade targets out to 1000 meters and suppress area targets out to 2000 meters.

The weapon includes a full solution fire control which includes Direct View Optics, Full Solution Ballistic Calculation; Digital Range Finder; CCD Video; a Tracker Module; Digital Compass; Environmental Sensors as well as many other options. The system contains a T&E mechanism capable of providing rapid target acquisition and ammunition can be fed from the right or left sides of the weapon. The Army is still conducting mission analysis and completing capabilities documentation for this system.

Program Status. The XM307 program is on track to transition from the technology base in FY04. A Milestone C decision is scheduled in

FY07 to support fielding with the FCS as the secondary armament system with a FUE in FY08.

Enhancing Army Precision Engagement Capabilities During the Program Years—Legacy, Interim and Objective Forces

In the 1990s, the Army began an ambitious program to digitize its force in an effort designed to shorten the plan-prepare-execute cycle. In addition to increasing force responsiveness and improving its ability to operate within the enemy's decision loop, it would provide a real-time CROP of the battlefield, control and set battlefield tempo, and greatly increase the overall precision, lethality and survivability of the force. Almost a decade into the digitization process, the Army has achieved a "First Digitized Division" (4th Infantry Division) capability down to platform level and is rapidly approaching a First Digitized Corps (III Corps) capability. This digitization capability is provided by a number of platforms and systems. The overarching system control and specific devices that provide information dominance are discussed in the final appendix to this annex. Below, as part of this appendix, are those major combat systems, such as the Abrams Tank and the Bradley Fighting Vehicle, that host the information dominance devices.

Concurrently, the Army has been selectively digitizing other Legacy Force units and has recently initiated a digital equipment redistribution strategy designed to ensure force-wide interoperability. At Fort Lewis, the Army is in the process of fielding the first two SBCTs, both of which will have the same digitization and situational awareness capabilities as the 4th Infantry Division.

The SBCT is inherently a precision unit. The force design of the SBCT provides the Army with precision strike and engagement capabilities not found in any other Army brigade. Specifically, the Reconnaissance, Surveillance and Target Acquisition Squadron, equipped with tactical UAVs and ground-based HUMINT specialist, provide the commander with unequalled situational understanding. The internetted command and control architecture—featuring Force XXI Battle Command Battalion/Brigade and Below—allows the commander to provide the same picture to lower echelons, including major combat platforms such as the Stryker vehicle, thereby establishing a real-time common operational picture for his unit. The Stryker Brigade also features organic ground-based sniper teams—the essence of precision strike and a critical combat requirement that has once again been validated during the ongoing Global War on Terrorism.

The SBCT's precision strike capability, as previously mentioned in this document, is truly global. C-130-transportable, the unit can rapidly deploy to austere environments thereby overcoming enemy area-denial and anti access efforts, and can quickly mount offensive operations with minimal reception, staging and integration. Although it excels in the mid-point of the operational spectrum, it can fight effectively as a fully committed unit in major engagements and battles with augmentation (such as attack aviation and/or rocket artillery). With its superior tactical mobility and excellent battlefield situational awareness, the SBCT can also execute difficult security missions such as guard, cover, screen, counterreconnaissance and rear-area combat operations. The superior off-road maneuverability of the Stryker vehicle combined with its dismounted infantry assault capability featuring robust anti-tank weaponry, ensures the SBCT can very effectively engage and destroy enemy armor in close, complex and/or urban terrain.

The Army is exploring alternatives in the upcoming program years that will further enhance the SBCTs ability to track and surveil and ultimately engage and destroy targets. Among the systems being examined are precision mortars, advanced artillery munitions such as Excalibur, and initiatives designed to further enhance the SBTC's situational analysis: Joint Tactical Radio System, Warfighter Information Network-Tactical, and the Distributed Common Ground Station-Army.

The Objective Force embodies precise and dominant maneuver, coupled with precision engagement, through a combination of maneuver, fires, and information dominance. As an offensive-oriented force, it conducts operational maneuver from strategic distances, executing synchronized, distributed operations as part of a Joint Force to destroy key enemy capabilities in a distributed, nonlinear battlespace. It provides seamless C4ISR, FCS, integrated sensors, attack and reconnaissance helicopters, expanded maneuver and fires with standoff, LOS and NLOS capabilities. These attributes enable the Objective Force to achieve total disintegration, dislocation, and destruction of enemy forces from tactical through operational levels. Direct lethal action of Objective Force maneuver and fires forces will contribute to the following joint efforts:

- Destroy and degrade enemy anti-access systems such as long-range missiles and artillery, unconventional forces, enemy surveillance and targeting capabilities.

- Participate in the destruction of enemy precision engagement systems. This represents a key task, given the significant threat that enemy systems represent to Joint Force freedom of action and maneuver.

- Seize key terrain and facilities required to support force flow and decisive operations, extension of the area of influence, and isolation of enemy forces.

- Degrade key enemy capabilities (C4ISR and logistical structures) essential to enemy offensive operations.

- Provide essential C4ISR and logistical support to the Joint Force.

- Support the JFC's information operations to gain momentum superiority.

Although the Army has not finalized the Objective Force design, it is well on its way with an organizational concept for the Units of Action. The UA concept includes a Brigade Intelligence and Communication (BIC) Company. This unit will plan, coordinate and execute communications and intelligence functions. The collocation of these functions under a common company level command will provide significant synergies, which will greatly enhance the UA's ability to persistently track and engage targets.

The UA's organizational design also includes a Reconnaissance Detachment, equipped with FCS and advanced UAVs. The reconnaissance detachment will conduct surveillance and reconnaissance, gain and maintain contact with enemy forces, develop the situation and enable the situational awareness of the UA. Also conducting reconnaissance is the Aviation Detachment equipped with the RAH-66 Comanche helicopter. The Aviation Detachment will also engage to destroy high-payoff or most dangerous target sets with organic weapons or by employing external networked fires under brigade control. (The Army's detailed plan to recapitalize and modernize its aviation fleet is detailed later in this appendix.)

The NLOS battalion is the UA's primary provider of destructive, suppressive, protective and special purpose fires that enable the UA to conduct decisive operations. It is envisioned that the FCS NLOS Cannon will provide accurate, reliable, responsive, on-demand, 24-hour, all weather, and all terrain, close supporting fires with a wide array of precision and non-precision munitions. The FCS NLOS-Launch System (NLOS-LS) will be fielded at both the Unit of Action and Unit of Employment levels. The NLOS-LS is a networked system of missile launchers with command and control systems that will provide precision and loitering attack munitions. NLOS mortars (organic to the UA Combined Arms Battalion) will also provide supporting fires to the Unit of Action. The combination of NLOS mortar, cannon, launch systems and HIMARS will provide the future commander with a greatly increased precision and lethal capability.

Discussion of Key Equipment—Objective Force and Legacy to Objective Force Fielding (Interim Force Fielding as Noted in Description or in Program Status)

A system overview of both the Stryker Armored Vehicle and the FCS was provided in Appendix 2 of this annex. Variants, as applicable, are detailed below.

FCS Cannon

Description. The FCS Cannon will provide accurate, reliable, responsive on-demand, 24 hour, all weather, and all terrain close supporting fires as an integral part of the Objective Force. System developments must be matched with the appropriate development of a suite of munitions that will provide for the attack and destruction of all target types with effects that can be scaled to mission and target set.

Program Status. The FCS Cannon is currently embedded in the overall FCS program architecture. The Army, in partnership with the Defense Advanced Research Projects Agency (DARPA) has established an aggressive, collaborative demonstration program in support of the FCS initiative. An FCS Program Manager has been assigned to DARPA and the overall management authority for the FCS program has been given to the Program Executive Officer for Ground Combat Systems (PEO-GCS). Boeing and SAIC have been selected from industry as the Lead Systems Integrator for FCS and are responsible to conclude the Concept and Technology Development phase for the overall FCS program up to the Milestone B decision in the 3QFY03.

Non-Line-of-Sight Launcher System (NLOS-LS)

Description. The NLOS-LS is a networked system of missile launchers with command and control systems that will provide precision and loitering attack munitions. The NLOS-LS will provide accurate, reliable, responsive on-demand, 24-hour, all weather, and all terrain fires as an integral part of the Objective Force. NLOS-LS provides networked, extended-range targeting and precision attack of armored, lightly armored and other stationary and moving targets during day, night, obscured and adverse weather conditions. The system's primary purpose is to provide responsive precision attack of High-Payoff Targets (HPT) in support of the Unit of Action (UA) in concert with other UA NLOS, external and joint capabilities. In the future, the system will also provide "discriminating" capability via automatic target recognition (ATR) and limited battle damage assessment (BDA). The system has flexibility to respond to the full complement of UA sensors, SOF, and other UE or joint elements. The NLOS-LS is a self-contained

system with multifunctional munitions (NLOS, ground-to-air, countermobility) capability. The system is capable of multi-modal transport. It can be fired from the ground and manned or unmanned tactical transport vehicles. NLOS-LS consists of the launch unit with individual containerized munitions and an onboard command and control capability. Munitions capabilities may require the development of additional munitions variants to meet operational requirements such as thermobaric and nonlethal applications. Variants should be the smallest number that satisfies all requirements. The system has an external mission planning software application that runs on the Objective Force battle command system for planning and execution of multiple and simultaneous missions including engagement with different munitions.

Program Status. The NLOS-LS is currently part the overall FCS program architecture. The Army, in partnership with DARPA, is involved in an aggressive, collaborative demonstration program in support of the NLOS-LS initiative that will transition to an Army SDD effort in FY04. An NLOS-LS Task Force was formed under PEO Rockets and Missiles to facilitate the transition and coordinate FY03 efforts to ensure initiation of NLOS-LS Block I SDD.

ATACMS

Description. ATACMS missiles are one of the Joint Force Commander's all-weather, responsive, deep strike weapons. They are being developed in a logical series of improvements to range, accuracy, and lethality. Missile production is continuous with each new block improvement, when ready, being cut into the existing production line. ATACMS Block I proved its effectiveness during Operation Desert Storm.

Program Status. The ATACMS program is being restructured. The FY04-09 Plan limits Block II/BAT procurement and funds a small number of ATACMS-Unitary missiles. An ATACMS-Penetrator variant is being demonstrated as part of an Army/Navy ACTD with test missile firings scheduled for FY03.

High Mobility Artillery Rocket (HIMARS)

Description. HIMARS provides early-entry Legacy, Interim, and Objective Forces with precision rocket and missile fires to a depth of 300 km. Mounted on an FMTV, HIMARS is C-130-transportable. It provides full MLRS family of munitions capability, yet requires 70 percent fewer airlift resources to transport a battery than the current M270 MLRS launchers.

Program Status. HIMARS is in Engineering and Manufacturing Development (EMD). FUE is programmed for 2QFY05.

Guided MLRS (GMLRS) Rocket

Description. GMLRS provides commanders with a precision munitions capability to ranges of 15-60 km. GMLRS is a major upgrade to the M26 series MLRS rocket with the objective of integrating a Guidance and Control (C&C) package and a new rocket motor to achieve greater range and precision accuracy. The improvement in accuracy (<3Mil CEP) will reduce the number of rockets required to defeat targets out to 60 km or greater ranges, reduce the number of rockets required per fire mission, reduce collateral damage, and directly contribute to reducing the logistical footprint of the Objective Force. A self-destruct fuze will reduce hazardous duds to <1 percent. Guided MLRS Unitary (GMLRS-Unitary) is a low-collateral damage rocket, capable of destroying high-payoff surface targets in complex and urban terrain, with pinpoint accuracy.

Program Status. GMLRS Engineering and Manufacturing Development (EMD) is an international program with the United Kingdom, Germany, France and Italy, and with a RDTE 50/50 cost share agreement between U.S. and European partners. The United States is managing the prime contract. LRIP is planned to start in FY03. The programmed GMLRS IOC is 2QFY06. GMLRS Unitary is in concept development and will begin a spiral SDD phase in FY03.

Lightweight 155 Howitzer (M777)

Description. The Army has a requirement for an advanced towed lightweight 155mm howitzer that meets increased operational thresholds for mobility, survivability, deployability and sustainability. The M777 Lightweight 155mm Howitzer is funded in the FY 04-09 Plan as a weapon system that meets this requirement. A joint Marine Corps/Army program, the M777 will provide accurate, reliable, responsive, on-demand, 24-hour, all weather, and all terrain close supporting fires to maneuver forces.

Program Status. On 8 November 2002, the M777 entered low-rate initial production (LRIP) for 94 USMC Howitzers to be delivered in FY03 and FY04. The FY 04-09 Plan funds the procurement and fielding of this system to selected Army units, to include the SBCTs.

Excalibur

Description. Excalibur is a cannon-delivered precision engagement, extended range artillery projectile that self-guides to a programmed aimpoint. Target and fuze data are programmed into the projectile via an inductive projectile programmer allowing precise target engagement throughout its range band. Munitions to be developed are unitary, smart and discriminating. Excalibur will eliminate the shortcomings of current area engagement munitions with precision, increased range, lethality, and minimize collateral damage.

Program Status. A major SDD contract restructure is currently underway.

120mm XM395 Precision Guided Mortar Munition (PGMM)

Description. PGMM is a 120mm precision (laser-guided) mortar munition, designed to defeat high-pay-off targets at extended ranges. It is envisioned as the maneuver task force commander's "hip pocket" precision indirect fire weapon capable of providing responsive, standoff defeat of high-value targets.

Program Status. PGMM is in Component Advanced Development (CAD). Milestone B and SDD are scheduled for 4QFY03. The current funding profile begins production in FY07, with fielding projected in FY08.

Aerial Common Sensor (ACS)

Description. ACS is a critical Objective Force system that satisfies the Army's requirement for a worldwide, self-deployable airborne ISR asset that can begin operations upon arrival into theater, in front of or along side the Objective Force. Wide-area surveillance throughout the breadth of the UE battlespace, precision targeting, and use of the DCGS-A for the ground station component makes ACS relevant throughout the entire spectrum of operations. ACS will provide commanders at every echelon the tailored, multi-sensor intelligence required for dominant maneuver, precision engagement, and information dominance. The air platform will be selected in FY03, and sensor payloads include COMINT, ELINT, IMINT, and MASINT, incorporating Electro-Optical (EO), Infra-Red (IR), Synthetic Aperture Radar (SAR), Moving Target Indicator (MTI), as well as multi- and hyperspectral imagery sensors.

Program Status. ACS is currently completing the Component Advanced Development (CAD) phase, scheduled to end in 3QFY03. Milestone B is scheduled for 4QFY03. IOT&E and Milestone C are scheduled for FY08. FUE is scheduled for FY09 in order to meet timelines for IOC of the first Objective Force unit.

Distributed Common Ground System-Army (DCGS-A)

Description. DCGS-A is a family of systems and an integral component of the Army's ISR networking strategy. DCGS-A will migrate disparate ISR systems into a joint common and interoperable multi-intelligence architecture to improve the ground commander's ability to react within the enemy's decision cycle. DCGS-A nodes located at each Army and joint echelon will task, process, exploit, and disseminate Army, joint, national, and coalition ISR sensor data and information in support of Objective Force and Joint Task Force operations. These physical nodes transparently interoperate with embedded DCGS-A software applications within the Future Combat Systems (FCS). Operating in a secure collaborative, networked environment. DCGS-A provides real-time sensor to commander, sensor-to -shooter, and sensor-to-analyst information tailored to mission, task, and purpose of the recipient.

Program Status. The DCGS-A program will employ a blocked-approach development and acquisition strategy to develop, demonstrate, and field improved system capabilities culminating with an objective capability fielding in FY08. XVIII Airborne Corps will demonstrate a DCGS-A Block I capability in FY04 and a multi-echelon DCGS-A capability will be fielded to III Corps in FY05.

Integrated Meteorological System (IMETS)

Description. IMETS, a legacy system that will migrate to the Objective Force, provides critical weather support to commanders in combat, operations other than war and peacetime operations. IMETS receives, processes and collates forecast, observation and climatological data to produce timely and accurate weather products tailored to meet supported commanders' requirements (e.g., NBC/smoke effects, aviation products, illumination/visibility products, and tactical weather effects).

Program Status. IMETS is primarily a non-developmental item (NDI) which will have three separate, distinct configurations: (1) the Vehicle Mounted Configuration; (2) the Command Post (CP) Configuration; and (3) the Light Configuration. The Vehicle Mounted and Light Configuration have successfully met their Milestone C and are in full rate production. The Command Post version is in Engineering and Manufacturing Development (EMD) and will undergo testing in FY04 and fielding initiated in FY05.

Phoenix Sensor System

Description. Phoenix Sensor System will replace the aging AN/TPQ-37 artillery locating radar. The Phoenix system will be fielded to each of the SBCTs and as a one per one replacement for existing Q-37 requirements. It will be developed in blocks, the first leveraging technology from the AN/TPQ-47. Phoenix Block II will incorporate technology developments from the Multi Mission Radar Science and Technology Objective (MMR STO). Technically, the Phoenix will have double the detection range of the current AN/TPQ-37 radar while improving accuracy and target throughput. Additionally, the Phoenix will provide a broad spectrum of target detection by providing mortar detection to 15 km, rocket detection to 150 km, and detection of missile launches out to 300 km.

Program Status. The program has started construction of the first EMD Block I systems. FY04 will continue the EMD effort with two Block I systems resulting in FY05. A LUT will be conducted in FY05 leading up to a MS C decision in 4QFY05. LRIP and IOTE are scheduled to begin in FY07 with an FUE of 1QFY08 and FRP beginning that same year.

Prophet

Description. Prophet is a dedicated, dynamically retaskable asset, which allows the tactical commander to visually depict and understand his battlespace, now and in the future. It provides a near-real-time view of the brigade/ACR/SBCT area of operations through the use of COMINT sensors to include the capability to detect, identify, and electronically attack selected emitters. The system provides expanded frequency and area COMINT coverage of the battlefield for situational development, awareness and force protection operations. Prophet will operate in the "on-the-move" or dismounted configurations.

Program Status. Prophet Block I passed IOTE in December 2000, completed Milestone III in March 2001, and has entered FRP, with initial fielding scheduled for January 2003. Blocks II/III are programmed for 1QFY03.

Tactical Unmanned Aerial Vehicle (TUAV)

Description. Each Shadow 200 TUAV system consists of four Shadow 200 air vehicles, six HMMWVs, two Ground Control Stations (GCS), one portable GCS, and four remote video terminals that can provide near-real-time video to commanders on the ground. The Shadow

200 TUAVs currently have an on-board electro-optic (EO)/infrared (IR) sensor payload. Objective payloads may include but are not limited to advanced EO/IR, all-weather synthetic aperture radar (SAR) and moving target indicator (MTI), and signals intelligence (SIGINT) sensors. The threshold range is 50 km with an objective range of 200 km and an on-station endurance of four hours. The threshold payload is 60 pounds with an objective capacity of 100 pounds. OPTEMPO requires a threshold of 12 sorties per 24-hours and an objective of 18 sorties per 24 hours.

Program Status. A successful IOTE occurred in April/May 2002 with a Milestone III/Full Rate Production decision approved in September 2002 by the AAE. First unit equipped was SBCT 3/2 IN in May 2002 and the IOC was declared in October 2002. Production and fielding to the remaining SBCTs continue under the FY04-09 Plan.

Aviation Modernization

The last five years have seen great progress in modernizing the Aviation Force. Fielding of the AH-64D Longbow Apache is well underway. Recapitalization programs for both the CH-47 and UH-60 have matured to the point where production will begin in the near term. Interim aviation transformation efforts are successfully retiring aging and obsolete aircraft from the force. Issues uncovered during previous military operations and deployments are being addressed.

Future modernization is being driven by a changing operational environment and emerging Objective Force requirements. Modernization challenges include:

- Fielding the RAH-66 Comanche and its companion UAV.
- Ensuring digital interoperability and effective operations with the joint/combined force.
- Fielding effective, affordable systems to enhance aviation survivability and improve Soldier stamina.
- Improving aircraft operational readiness.
- Addressing Hellfire inventory concerns and modernization requirements.
- Replacing obsolete air traffic services equipment and maintaining compliance with future airspace usage requirements.
- Digitizing Aviation Logistics and modernizing aviation ground support equipment.
- Developing the technologies to ensure fielding of Objective Force unmanned systems, interoperability of manned/unmanned aircraft, and Next Generation/Future System development.
- Leveraging technology to reduce costs, extend aircraft service life and improve training.

Modernization of selected Legacy Force systems is essential to current operations as well as support to Interim and Objective Force units. Legacy Force initiatives focus on divesting older aircraft and recapitalizing existing aircraft projected to remain in the fleet into the far term. Under current projections, the AH-64 will remain in the fleet until 2030 at a minimum. The remanufacture of 501 AH-64As to the AH-64D configuration will be complete prior to the end of the FY04-09 Plan. A focused recapitalization effort is also programmed across the Apache fleet to extend aircraft life by addressing high maintenance demand/O&S

cost drivers and by incorporating a 2nd Generation FLIR (i.e., Modernized Target Acquisition Designation Sight/Pilot Night Vision System (M-TADS/PNVS)).

The OH-58D Kiowa Warrior will remain in the fleet under current transition plans until the 2015 timeframe. Kiowa Warrior modernization is limited to safety enhancements and software upgrades to maintain compatibility with the ground force. Just over 950 UH-60As with an average age of almost 20 years are in critical need of recapitalization.

The UH-60M/HH-60M modernization program is scheduled to begin production in FY04 to bring these aircraft up to UH-60L lift/range capabilities, reduce O&S costs, improve transportability, enhance survivability, digitize avionics and flight management systems, provide digital air-ground interoperability, and extend aircraft life.

The CH-47 modernization program includes a fleet wide engine upgrade program and recapitalization of 332 CH-47Ds to the CH-47F/MH-47G configuration (271 CH-47F, 61 MH-47G). These efforts restore lift capabilities, incorporate digital avionics, provide digital air-ground interoperability, and extend aircraft life by approximately 20 years.

The Army is currently reviewing its fixed wing requirements for the Objective Force. The cornerstone of this review is the Fixed Wing Operation and Organization Plan. This plan outlines three major missions for fixed wing to include personnel transport, logistical support and intelligence gathering provided by Special Electronics Mission Aircraft (SEMA). With the submission of this O&O, the Army will be able to plan and execute a balanced modernization plan to address current inadequacies of the fixed wing fleet. In the interim, fixed wing will modernize its aging, turboprop fleet (C-12 and RC-12) will be modernized with Global Air Traffic Management system (GATM) as well as other safety and cockpit management systems, which will keep these aircraft relevant until Objective Force requirements mature.

Essential to the support, sustainment, and modernization of the aircraft programs discussed above are aviation's supporting capability programs (Aircraft Survivability Equipment (ASE), avionics, Aircrew Integrated Systems (ACIS), Air Traffic Services/Air Traffic Control (ATS/ATC), Aviation Ground Support Equipment (AGSE), Training Aids, Devices, Simulators, and Simulations (TADSS)). Aviation TADSS must leverage technology to provide effective and affordable combined arms/joint training and mission rehearsal and to ensure simulators remain current with the aircraft/systems they are replicating.

The Aviation Force: Near Term

The urgent need to address the steadily deteriorating condition of the aviation fleet and accelerate RC modernization has driven the interim aviation restructuring plan. This plan, which is currently underway and expected to be completed not later than FY05, reduces aviation structure approximately by 20 percent to:

- Posture aviation for transition to the Objective Force concept.
- Accelerate divestiture of approximately 1,000 legacy aircraft (UH-1 and OH-58A/C).
- Accelerate modernization across the AC and RC.
- Restructure and standardize attack and lift formations across the force (divisional attack battalions to 18 aircraft, RAS to 9

aircraft, corps attack battalions to 21 aircraft, cargo companies to 14 aircraft).

- Adjust stationing and alignment of RC units to mitigate near-term risk associated with reducing AC lift assets.

- Maximize training technologies to maintain crew proficiency.

- Invest in initiatives to improve aircraft reliability/maintainability.

- Continue emphasis on fielding Comanche.

This structure provides capabilities necessary to meet Army requirements across the spectrum of operations until transition to an Objective Force structure becomes feasible. Implementation of Flight School XXI remains a priority. Flight School XXI will improve aviator proficiency and allow retirement of legacy OH-58C training aircraft. The Army will continue to refine aviation Objective Force structure requirements with the expectation that they will be implemented in accordance with the Army's Objective Force Unit Set Fielding Plan and RAH-66 fielding.

Aviation in the Objective Force

Army aviation is a critical enabler for the Objective Force in the conduct of decisive joint operations. Aviation conducts maneuver, maneuver support, and maneuver sustainment operations across the spectrum of conflict. Aviation will be instrumental in achieving simultaneous, distributed, continuous, combined arms air-ground operations. Aviation units develop situations out of contact, maneuver to positions of advantage, engage enemy forces beyond the range of their weapons, destroy them with precision fires, and provide close support. The Objective Force quality of firsts (see first, understand first, act first, and finish decisively) will require significant contributions from highly skilled and knowledgeable aviation Soldiers employing aviation systems from entry operations to decisive action.

The Objective Force operational concept requires a robust, fully modernized aviation force. Teaming UAVs with manned systems will enhance operational fires, maneuver, and intelligence collection capabilities for the commander. Key Objective Force enablers are the RAH-66 Comanche teamed with unmanned systems and key enabling technologies in electronics, UAV interoperability, air platforms, propulsion systems, and weaponization. The AH-64D will receive key interoperability upgrades and sustainment improvements to bridge the Interim-to-Objective Force period with the Longbow Block III improvements. The Army is continuing to examine the best means to achieve the vertical envelopment capability required to rapidly project FCS-equipped forces across difficult or distant geographic locations.

The HLVTOL and Air Maneuver and Transport concepts represent potential solutions to this joint air lift challenge. Regardless, the CH-47F is expected to remain the Army's heavy lift helicopter until at least the 2020-25 timeframe. The UH-60M/HH-60M are expected to meet utility/medical evacuation (MEDEVAC) mission requirements until the 2025 timeframe. The Future Utility Rotorcraft (FUR) is envisioned to fill priority air assault, general support and airborne C2 requirements for vertical envelopment in the far-term. FUR will also be needed for aerial MEDEVAC as well as special operations support.

To support full-spectrum operations and to sustain the force, aviation logistics must be as responsive and capable as the force it supports. To improve responsiveness, reduce

vulnerability, and increase operational momentum, aviation must reduce the current in-theater aviation logistics footprint and digitize its logistics systems.

Objective Force Air Traffic Services (ATS) units must be specially equipped, highly trained, rapidly deployable on short notice, and capable of operating within U.S. and international airspace. They will provide the full range of air traffic services from homeland security to major combat operations. Army ATS will remain the core enabler for Army Airspace Command and Control, ensuring synchronized access of the increasingly congested joint airspace.

Aviation Objective Force assets are envisioned to be organized at all levels of the Units of Employment as well as the Unit of Action maneuver brigade.

Discussion of Key Equipment

RAH-66 Comanche

Description. The RAH-66 Comanche is the Army's Objective Force reconnaissance, mobile strike, and close combat helicopter. It is a two-pilot, twin-engine aircraft with an all-composite, low-observable fuselage and second generation targeting and pilotage sensors. Supportability features include embedded diagnostics, minimal special tools, reduced support equipment, and fewer parts, which contribute to a reduced logistical footprint. Comanche is self-deployable as well as transportable. Comanche provides the Objective Force:

- Level 4 control of UAVs to leverage manned/unmanned integration.
- The ability to integrate and synchronize the joint C4ISR network for joint fires and immediate responsiveness to the Task Force Commander's needs.
- Advanced sensors to develop the common operating picture and actionable combat information.
- Low-observable features and advanced weapons to allow close-in support of ground tactical maneuver or suppression of enemy air defenses, each critical to the success of the ground tactical plan.
- Reduced O&S costs and two-level maintenance (the maintenance concept for the Objective Force).

No other current or programmed helicopter or unmanned system can meet these requirements.

Operational Requirement. Comanche supports the Objective Force Commander as a survivable reconnaissance and mobile strike platform. Comanche's ability to develop and share the common operating picture and orchestrate lethal, nonlethal, precision, direct and indirect fires is critical to the integration and effectiveness of air-ground team operations of the Objective Force. By interfacing with Army and joint C4I systems and teaming with UAVs, Comanche will further extend the operational reach of the maneuver force. The Comanche will be organic at Unit of Action Maneuver Brigades, at Unit of Employment level (division), and to Special Operations Aviation.

Program Status. The EMD phase of the development program began following the

Milestone II decision in April 2000. With the subsequent restructured approach, the EMD contract will continue design and testing efforts to ensure that the weapon system meets cost and performance requirements. The program restructure plan includes 11 aircraft that are planned over the development period (IOC FY09) for flight test support, development test and Initial Training Capability (ITC). The ITC aircraft will be utilized to support pilot training for the Limited User Test and Initial Operations Test and Evaluation. Four of the ITC aircraft will remain in the fielded fleet to be used as trainers. The current RAH-66 acquisition objective is 650 aircraft of the total 819 required for the Objective Force, with initial fieldings to Objective Force Unit of Action maneuver brigades.

AH-64 Apache

Description. The AH-64 Apache is the Army's heavy division/corps attack helicopter and will retain a role in the Objective Force. The Apache is a two-pilot, twin-engine attack helicopter designed to meet the current force mission requirements for attack and reconnaissance worldwide, day or night, and under adverse weather conditions. The Apache has been in the Army inventory since 1986, and an upgraded AH-64D began fielding in 1998. The AH-64D upgrade, among other improvements, adds a millimeter wave Fire Control Radar (FCR), Radar Frequency Interferometer (RFI), fire and forget radar-guided Hellfire missile, and cockpit management and digitization enhancements. A total of 501 AH-64As will receive the upgrade. The combination of the FCR, RFI, and the advanced navigation and avionics suite of the aircraft provides increased situational awareness, lethality and survivability. The Apache recapitalization program integrates a number of related initiatives to produce and/or retrofit aircraft across the fleet to meet the objectives of the Army's recapitalization policy and address lessons learned from recent combat operations and deployments. The program goals are to reduce the overall average airframe age of the fleet to the half-life metric of 10 years by 2010, increase the unscheduled Mean Time Between Removal (MTBR) by 20 percent for selected recapitalized components, and maximize the marginal return on recapped components by 20 percent. The Modernized Target Acquisition and Detection System (M-TADS) provides the Army's attack helicopter force with second generation FLIR. The M-TADS greatly improves the pilot's capability while flying with the Night Vision System as well as conducting engagements.

Program Status. The Army will convert a total of 501 A models to the Longbow configuration. Multi-year I completed the delivery of 232 AH-64Ds in 3QFY02. A second multi-year contract was signed in October 2001, procuring an additional 269 AH-64Ds with deliveries through FY06. Fielding of the M-TADS to the total fleet begins in FY06.

UH-60 Black Hawk

Description. The UH-60 is the Army's objective utility and MEDEVAC helicopter. The UH-60 fleet is composed of 967 UH-60As, which began production in 1977, and just over 600 UH-60Ls, which began production in 1989. Black Hawk can transport 11 fully equipped combat troops and external loads up to 8,000 lbs for the UH-60A and 9,000 lbs for the UH-60L.

The UH-60M/HH-60M (MEDEVAC variant) program will recapitalize and upgrade aging UH-60s. This program inserts digital

technologies, improves system survivability, addresses operating and support cost drivers, incorporates GATM requirements, improves strategic transportability, integrates Air Warrior, and extends aircraft life. The Black Hawk Modernization ORD calls for a Block II upgrade to the fleet commonly referred to as the UH-60X. However, emerging analysis for Army Transformation points toward operational requirements for a Future Utility Rotorcraft (FUR), with capability requirements not feasible through UH-60 upgrades. As Objective Force transformation requirements mature, it is likely that the Army will defer the validated UH-60 Block II requirements in favor of a new-start FUR. The UH-60M program would then continue until FUR production began.

Another significant modification is the Army Airborne C2 System (A2C2S). This mission kit will convert selected UH-60s into an airborne tactical operations center, providing the maneuver commander a highly mobile, self-contained and reliable airborne digital command post. A2C2S will provide a rapidly deployable means of command and control that can be deployed worldwide on short notice to support missions ranging from low-intensity humanitarian assistance to high-intensity conflict.

Program Status. The Army acquisition objective for the UH-60 fleet is 1,680 aircraft and will be reached by the end of FY09. The UH-60M and HH-60M (MEDEVAC variant) programs are currently in the SDD Phase. Milestone C is scheduled for the 2QFY04 with FUE scheduled for FY06. Initial fielding is scheduled in the Special Operations and conventional light forces. The Milestone C decision for A2C2S is scheduled for FY04 with a Full Rate Production decision in FY05. The A2C2S procurement objective is 120 systems with initial fielding scheduled for the Counterattack Corps and the 160th SOAR.

CH-47 Chinook—See Appendix 2 to this annex.

Fixed-Wing

Description. Fixed-wing aircraft provide the force commander with timely movement of key personnel to critical locations throughout the theater of operations, the movement of time-sensitive/mission-critical supply items and repair parts to continue the warfight, and intelligence collection/support. Fixed-wing aircraft provide efficient, effective transportation during peacetime and wartime operations. Special Electronic Mission Aircraft (SEMA) aircraft collect, analyze, and disseminate signal communications and imagery intelligence in support of wartime requirements for regional Combatant Commanders, field commanders and national intelligence assets.

Program Status. The UC-35 (medium range) is currently in procurement with 26 on hand with an AAO of 67. There is currently one additional UC-35 programmed for procurement within the FY04-09 Plan. The Aerial Common Sensor is currently being developed as the replacement for the SEMA aircraft (RC-12 and RC-7). This aircraft is programmed to start fielding in FY09 (60 aircraft). The major initiative for fixed-wing is the development of an Army approved Operational and Organization Plan that will determine the fixed-wing requirements for the Objective Force. These requirements will be

completed in FY03 and will determine the replacement for the aging C-12 (short -range aircraft) and C-23 (cargo aircraft).

Aviation Rockets and Missiles

Air Common Modular Missile (ACMM)

ACMM will provide greatly enhanced capabilities over the Hellfire family of missiles. This will be a joint program to replace a broader family of air-to-ground missiles such as Maverick. ACMM's tri-mode seeker will enable precision, cooperative and autonomous engagements out to extended BLOS ranges in day, night, and obscured and adverse weather battlefield environments. ACMM's multi-effects warhead will provide lethality overmatch against armor and non-armor targets. ACCM is the first increment of a larger effort to develop a Common Modular Missile (CMM). Ongoing FCS and Objective Force munitions analysis will provide the information the Army needs to make decisions regarding the development of CMM as an ACCM Block II follow-on effort.

Hellfire (HF) Missile and Advanced Precision Kill Weapon System

Description. The HF air-to-ground missile is employed to destroy armored and high-value point targets. Semi-active laser (SAL) HF tracks laser energy delivered by ground or airborne designators while Longbow HF uses internal millimeter wave radar frequency (RF) for autonomous guidance.

The Advanced Precision Kill Weapon System (APKWS) incorporates laser guidance into the 2.75" Hydra-70 rocket to provide a lower-cost, lighter-weight, precision weapon capable of engaging non-armored to lightly armored targets and providing an alternative to HF against targets such as buildings, command posts, ADA sites and other targets not requiring the HF. The APKWS program also includes accuracy and lethality improvements to the family of unguided rockets.

Program Status. SAL HF missiles are no longer in production. Longbow HF entered production in 1995 and completes production of 12,905 missiles in FY03. Modernized Hellfire requirements are being integrated into the ACMM program with FUE scheduled for 2009 to coincide with Comanche FUE. APKWS is scheduled to begin production in FY05.

Supporting Program Modernization

Aviation's supporting programs are essential to the support, sustainment, and modernization of the aircraft programs discussed above. These programs are essential to sustain and protect crews/aircraft, maintain interoperability with supported units, and field Objective Force capabilities.

Aircraft Survivability Equipment (ASE). The Suite of Integrated Infrared Countermeasures (SIIRCM) will provide an enhanced infrared countermeasures capability to production and re-capitalized aircraft that will include the AH-64, UH-60 and the CH-47 platforms. An advanced missile warning with an improved countermeasures dispenser system and advanced flare munitions is currently being tested and integrated into these platforms. Developmental efforts will continue throughout this timeframe and will culminate with the acquisition of a multi-band solid state laser jam head capable of defeating all known IR threats. Aircraft undergoing recapitalization and remanufacture will have the required supporting wiring and hardware installed to prepare them for the arrival of the SIIRCM devices.

Aviation Electronics (Avionics). Avionics programs are designed to ensure aviation platforms meet combined arms and joint requirements for C2, mission planning, communications, navigation (to include worldwide civil airspace), information interchange, and interoperability. Major avionics initiatives include fielding a modern airborne C2 system for the UH-60 and a digital TOC for aviation units (A2C2S), ensuring FBCB2 interoperability requirements achieved by using the Improved Data Modem (IDM) common gateway on all aircraft; migrating from Aviation Mission Planning System (AMPS) to the Joint Mission Planning System (JMPS); providing NLOS communications and position tracking with the AN/ARC-220; equipping aircraft with the Joint Tactical Radio System (JTRS); fielding of improved GPS equipment for improved weapons accuracy and navigation; and meeting mandated GATM requirements for civil airspace utilization.

Aircrew Integrated Systems (ACIS). The ACIS program addresses those items of equipment that are used to sustain Army aircrews and troops throughout the flight profile, enhancing mission performance and aircrew survivability during operational missions, training, aircraft crash, and the post-crash period prior to rescue. The ACIS items that accomplish the aircrew-aircraft integration functions include aircraft cockpit airbags, chemical/biological protective mask blowers, helicopter oxygen systems, nuclear flash and laser eye protection, helmets, flotation devices, survival kits and equipment. Air Warrior is the primary ACIS program. It begins fielding in FY04 providing integrated, modular life support equipment and chemical/biological protection, reduced weight/bulk, and significantly improved flight time in MOPP 4 gear from 1.6 hours to 5.3 hours.

Air Traffic Services/Air Traffic Control (ATS/ATC). ATS/ATC modernization fields smaller, lighter, more efficient, digitally connected terminal and en route communications and precision navigation systems for tactical and fixed-base operations. Major programs include the Tactical Airspace Integration System (TAIS), the Air Traffic Navigation, Integration, and Coordination System (ATNAVICS), Mobile Tower System (MOTS), Joint Precision Approach Landing System (JPALS), and GATM. JPALS and GATM are mandated by civilian air control authorities and joint services to operate within 21st century airspace.

Aviation Ground Support Equipment (AGSE). The goal of AGSE modernization is to reduce logistical support requirements and improve aircraft operational readiness. Initiatives focus on improved automation and efficiency in three areas of development: modernization of Test, Measurement, and Diagnostics Equipment (TMDE); integration of seamless logistics management through automation systems such as the GCSS-A, and replacement of aging ground-support equipment.

Aircraft Component Improvement Program (ACIP). ACIP sustains engineering efforts to investigate, correct, and qualify turbine engine and Auxiliary Power Unit (APU) field-identified, safety critical and reliability deficiencies. ACIP inserts emerging technology, extends service life, drives down O&M and spares costs, and improves readiness by keeping engines operational and on-wing. Return on investment is greater than 12:1 based on historical data using standard, approved costing models.

Training Aids, Devices, Simulators, and Simulations (TADSS). TADSS modernization is critical to the combat effectiveness of our aircrews and maintainers, and to reducing operational costs. Simulator

concurrency, fidelity, and combined arms tactical and mission rehearsal simulators/ simulations that virtually network (and when applicable, constructive and live simulation systems) are major initiatives.

Aviation Summary

Aviation's modernization efforts are focused on fixing warfighting deficiencies (particularly those uncovered during recent operations), aligning the aviation force with the Army Objective Force concept, and fielding aircraft/ subsystems required to achieve full-spectrum operational capability. Modernization is achieved through force structure changes, training initiatives, and materiel modernization (RAH-66, AH-64D, UH-60M/HH-60M, CH-47F, UAVs, Air Warrior and other subsystem modernization programs). Aviation is supported by S&T programs designed to provide the knowledge base required to upgrade existing aircraft and meet the challenges of new aircraft/weapon system development. The Army's commitment to divesting legacy, obsolete AH-1, UH-1, and OH-58C aircraft and ensuring balanced modernization across both the AC and RC is being realized through the Aviation Interim Transformation Initiative. The Army continues to review near-term aviation funding issues (aircraft survivability equipment modernization, digitization, aircraft operational readiness) to best align programs to create more executable strategies and to identify acceptable risks to allow tailoring of program requirements. Future challenges lay ahead with emerging GATM requirements for airspace utilization, interoperability requirements (UAVs, FBCB2, GCSS-A), and conversion to an objective aviation force structure.

Discussion of Key Equipment—Legacy Force Only

Abrams Tank

Description. The Abrams recapitalization program is a modernization program of the legacy armored force that seeks to maintain combat overmatch and reduce O&S costs. The core of this program is embodied in the M1A2 SEP, a program that selectively upgrades M1 tanks or retrofits fielded M1A2 tanks with rebuilt critical components that bring the tanks to near zero hours/miles. The key major improvement to be incorporated in all M1A2 SEP tanks is the installation of the LV-100 turbine engine that provides the tank with improved agility and mobility, easier maintenance and reduced O&S costs over the tank's current and aging AGT-1500 engine. All M1A2 SEP tanks will also have an Under-Armor Auxiliary Power Unit (UAAPU). Additional SEP tank improvements include: 2nd Generation Forward Looking Infrared (FLIR) sensor in the Commander's Independent Thermal Viewer (CITV) to enhance target acquisition and significantly improve lethality; hardware and software that supports Army digitization and the FBCB2 system; digital diagnostics system that enhances tank maintenance and sustainment; thermal management system that reduces the tank's battlefield signature and an improved armor system that improves survivability against emerging threats. The M1A1 Abrams Integrated Management Program (AIM) is a rebuild program with selective technology insertions designed to extend the service life

of the fleet while reducing O&S costs. The M1A1 D (Digitized) tank is a rebuilt tank appliquéd with FBCB2. The main features of the AIM program include a service life-extension program for the tank's current AGT-1500 engine and the digitization of M1A1 D tanks through installation of FBCB2 appliqués.

Program Status. The Army is currently fielding M1A2 SEPs to the 4th Infantry Division and 1st Cavalry Division and expects fielding to continue until FY05. At present, Unit Set Fielding of Abrams and Bradley Fighting Vehicles is programmed for the 3rd Armored Cavalry Regiment. Currently, the Army is projected to procure 588 M1A2 SEPs and 545 AIM tanks.

Bradley Fighting Vehicle

Description. The M2A3 (rebuild and selective upgrade) fielding (595 platforms) to the Counter Attack Corps (1st Cavalry Division and 4th Infantry Division) ensures overmatch by increasing the ability to acquire, identify, and engage targets over the A2, in both day and night conditions. The A3 Bradley allows the crew to acquire more targets faster by adding the 2nd Generation Forward Looking Infrared (2GF) with a CITV). The POS/NAV system enhances the crew's navigation capability and their ability to pinpoint and identify friendly and enemy positions. The A3's new integrated FBCB2 digitized C2 system provides for a near-real-time integrated data link between the A3 Bradley and other combat vehicles. The M3A2 ODS-D will support the 3ACR with FBCB2, Improved Bradley Acquisition System and 2GF (131 platforms). The M2A2 ODS-D, an M2A2 ODS Bradley digitized with FBCB2 appliqué supports the fielding of engineer variants (187 platforms) within the Counter Attack Corps. The M2A2 ODS has limited upgrades to improve lethality, survivability and reliability. 1,176 platforms are expected to be fielded to AC forces as follows: 3ID, 2ID, 1ID and 1AD.

Program Status. The Army will modify and field 595 A2 Bradleys to the A3 configuration and, over the course of the FY04-09 Plan, 473 to ODS-D configuration. Digitization of the rest of the AC fleet is subject to an FY06 decision linked to the FY03 FCS Milestone B decision.

Summary

Successful tracking, surveillance and destruction of enemy forces seeking cover, concealment and protection begins with the power of a ground maneuver capability that dislodges enemy forces from their sanctuary. It ends with the linkage of sensors to delivery systems that combine to provide lethal, accurate, and timely effects on enemy forces. As the Army transforms to an Objective Force design and capability, it will explore new and promising technologies that will provide enhanced strike capabilities. Stryker, FCS, Comanche, HIMARS, Prophet, and other systems detailed in the preceding paragraphs of this annex are examples of the Army's intent to develop an overwhelming ISR and precision engagement capability. An overwhelming ISR and precision engagement capability is paramount to support the Objective Force's joint role as a dominant maneuver and precision engagement force.

Inherent in this role is the requirement for all means of precision strike to operate within a

joint and combined system of systems and to be strategically responsive so that it remains an effective partner in the joint fight. This means that the Army must maximize commonality of organizations and equipment as well as fully leverage information technologies. Army Transformation will meet these key requirements. However, Transformation also recognizes and will depend upon another critical factor—the Soldier. On the asymmetrical, chaotic, and nonlinear battlefield, the Soldier on the ground operates, and will continue to operate, as an indispensable part of the joint team. Today, operations in Afghanistan and Southwest Asia reaffirm the Soldier's role that enables persistent surveillance and reconnaissance and the right combination of maneuver, fires, and information operations to achieve precision engagement. Army Soldiers bring the essential human dimension to warfighting dominance.

Appendix 4: Assuring Information Systems in the Face of Attack and Conducting Effective Information Operations (IO).

Information is an essential foundation of knowledge-based warfare. It enables commanders to coordinate, integrate, and synchronize combat functions on the battlefield. To gain the relative advantage of position (maneuver) and massing of effects (firepower), commanders must act while information is relevant and before the adversary can react. The Joint definition of Information Operations (Information Operations), emerging from the DoD directed Information Operations Roadmap Study, presents IO as "The employment of the core capabilities of electronic warfare, computer network operations, PSYOP, military deception, and operations security, in concert with specified supporting and related capabilities, to affect or defend information and information systems as well as influence decision making." Supporting capabilities are specified as physical attack, physical security, information assurance and counterintelligence, with related capabilities of public affairs and civil military operations.

Information Operations are full spectrum in their contribution and provide the commander another set of operational tools to integrate into the overall operational campaign planning and execution. Information Operations also provide Army commanders with an overwhelming competitive advantage throughout and across the battlefield. The effective use of Information Operations enables the Legacy, Interim, and Objective Forces to dominate the battlefield by enhancing friendly decision-making processes while conversely slowing those of the adversary. In addition, Information Operations, now and into the future, are critical to the commander's ability to achieve dominant maneuver, precision engagement, full dimensional protection, focused logistics, and combat overmatch against any potential adversary.

Both defensive Information Operations (safeguarding friendly information and information systems) and offensive Information Operations (PSYOP, deception, computer network operations, electronic warfare and physical attack to influence and affect the adversary's information, information systems, and decision-making abilities) are key to Seeing First, Understanding First, Acting First, and Finishing Decisively. To create an effective Objective Force, the Army must ensure the adequate investment of critical resources to develop and field advanced Information Operations capabilities. Without information

dominance, the Army's current and future combat systems lose much of their competitive edge on the modern battlefield.

Information Operations solutions for the Legacy and Interim Forces can best be addressed through education, training, and the incorporation of lessons learned in effective Tactics, Techniques, and Procedures (TTP). The most efficient and effective approach to the modernization of Army IO is through the integration of Information Operations functionalities into the design of the developmental Battle Command System. This includes information processing, exchange, and decision support capabilities, the modeling of courses of action, and the simulation support required for effective operations and training support. Integrated Information Operations may be expensive, but have proven themselves highly cost effective when dominating the modern battlefield and saving Soldiers lives.

Since the Army considers Information Operations to be an integrating strategy, it is through the education and development of Information Operations -savvy Soldiers and the incorporation of Information Operations functionality into modernized battle command systems that this capability is acquired. Fielding of modernized information systems is then implemented in accordance with Unit Set Fielding and Software Blocking guidelines. Adherence to these guidelines ensures that Information Operations capabilities are fully interoperable between battlefield functional areas. Investment in Information Operations, to include modernization as well as the training and education of IO-savvy Soldiers and leaders, will ensure that the Army continues to be fully capable of winning our Nation's wars decisively while simultaneously protecting our vital national interests in any environment in the world.

Materiel programs associated with IO are located in Appendix 6 to this annex.

Appendix 5: Enhancing the Capability and Survivability of Space Systems and Supporting Infrastructure.

Space Capabilities Enable Transformation

Space capabilities enhance all aspects of military operations today and will provide even greater utility as Army Transformation evolves. The countless number of precision maneuvers, NLOS C4 linkages, and situation awareness demands fundamental to ground warfare makes the Army the largest military user of space capabilities. Legacy Forces and emerging Interim Forces routinely leverage space systems for intelligence, communications, early warning, positioning, weather and terrain information and support. The future Objective Force will not only exploit current, planned and programmed space systems, but Objective Force requirements will help shape the design of future space systems and their architectures. These space force enhancement capabilities will play an increasingly key part in the operational simultaneity, situational understanding, precise and tactically responsive ISR, and assured communications implicit in the Objective Force Operational Concept. Therefore, operationalizing space capabilities, and implementing Space Control to protect space assets and simultaneously deny space access to our adversaries will be critical to Army Transformation and the Objective Force's ability to conduct full-spectrum operations.

Space in Support of Land Force Operations

Support provided to ground maneuver forces from space is encompassed by five force enhancement functional areas:

Satellite Communications (SATCOM). Space-based communications capability is key to leveraging other space capabilities. SATCOM must provide a robust, flexible and seamless surface-through-space network that extends terrestrial capabilities. An integrated high-capacity SATCOM backbone will provide reachback connectivity that allows implementation of split-based command and control and logistics support concepts. This architecture will also support interoperability with joint, coalition, commercial, and civil communications networks. As a result, Interim and Objective Forces will have reliable, on-demand, beyond/non-line-of-sight communications for enhanced early warning, en route mission planning and rehearsal, and responsive combat service support (CSS) while maintaining a reduced footprint in theater. Reliable SATCOM enhances increased responsiveness, agility, versatility, survivability and sustainability.

Intelligence, Surveillance and Reconnaissance (ISR). Numerous space systems contribute to the collection, processing, dissemination and use of battlefield data and tactical information. In fact, space-based ISR capabilities will most often be the first "eyes on target" in support of current and transformed Army forces. During OCONUS military operations, from the initial intelligence preparation of the battlespace to final updates on aerial ports and seaports of debarkation, space systems provide ISR products and targeting information that are critical to ground maneuver forces. Should DoD analysis, research, and planning culminate in system fielding, Interim and emerging Objective Force tactical commanders will have routine access to a Space-Based Radar (SBR). SBR's Ground Moving Target Indicator (GMTI), Synthetic Aperture Radar (SAR) and Digital Terrain Elevation Data (DTED) capabilities could be a high value addition to the tactical commander's ISR toolkit. Simultaneously in multiple theaters, SBR could provide ground warfighters with near persistent, all-weather, day-night coverage of deep/denied areas, minimal terrain masking for a more complete picture of the battlespace, and the ability to cue organic sensors and weapon platforms for precision attack of tactical targets.

Position, Navigation and Timing (PNT). Embedding automated access to global, real-time PNT in maneuver, command and control, and support systems serving interim and objective forces contributes directly to enhanced warfighter situational awareness, lethality, agility and survivability. For example, PNT capabilities are essential to the common relevant operational picture (CROP) that Objective Force units will use to locate and identify friendly forces and greatly reduce the chances for fratricide during decisive operations. Precision guidance and timing capabilities enhance weapon platform lethality by massing the effects of long-range munitions. Near-term Global Positioning System (GPS) enhancements will make the system more resistant to jamming and spoofing while maintaining critical system precision.

Weather, Terrain and Environmental Monitoring (WTEM). Access to near real-time and predicted "tactical" weather through organic small weather satellite terminals will enhance planning and decision-making for Interim and Objective Force ground commanders. Combined with terrain and environmental data from space sensors, such

monitoring allows warfighters to predict weather effects on munitions and obscurants; assess trafficability; and determine changes to terrain or infrastructure that may constitute obstacles to maneuver. Developments taking place now in the use of spectral imaging data from newly launched satellites significantly increase the ability to identify surface materials-including vegetation, soils and man-made features in a tactically relevant timeframe will be of significant benefit to Interim and Objective Force units.

Missile Warning. Spurred on by the successful use of ad hoc systems during Desert Storm, the timeliness of early warning to deployed forces was substantially improved by the fielding of the Joint Tactical Ground Station (JTAGS). JTAGS provides an in-theater processing capability for data from Defense Support Program (DSP) surveillance satellites. This improved warning enhances the active defense, passive defense and attack operations elements of the missile defense mission with improved launch-site location and impact-point predictions. Interim and Objective Force units will be served by the next generation of missile detection satellites, the Space-Based Infrared System (SBIRS). JTAGS will give way to Multi-Mission Mobile Processor (M3P) upgrades that will further enhance the in-theater ability to detect and predict the flight of hostile ballistic missiles.

Army Forces Assuring Access to Space Operations

Because space capabilities are so important to ground warfighters, the Army works to assure access to space through its contributions to space control.

Space Control. U.S. dominance in space is not guaranteed. Some forty nations have space programs, and the array of commercial systems, including communications, intelligence, targeting functions, grows steadily. Adversaries understand the advantages of operating from space. Those without domestic space programs or access through allies can readily purchase military quality capabilities from commercial providers. Potential adversaries could probe U.S. space systems for vulnerabilities, or attempt to alter the space environment to disrupt our space operations. They might gain access to our systems and tamper with data or exploit it for hostile purposes. Each of these approaches has unacceptable implications for our land forces.

Space control, a joint mission shared by all Services, includes combat and combat support operations to ensure freedom of action in space for the United States and its allies, and, when directed, actions to deny an adversary freedom of action in space. The space control mission area includes the elements of prevention, surveillance, protection and negation. The Army contributes to the space control capabilities of the Commander, U.S. Strategic Command and the various theater combatant commanders. Powerful ground based space surveillance systems on Kwajalein Atoll in the Pacific assist Commander, U.S. Strategic Command identify and characterize potential adversary space capabilities. The Army supports protection of our space systems by testing system vulnerabilities and developing protective technologies. As the leader in ground-based air and missile defense, much of the Army's R&D emphasis today includes development of technologies to temporarily or permanently negate an adversary's space capability. This will be a key capability for Interim and Objective Forces and a strong deterrent to potential adversaries. Army support for a joint-orchestrated Space Control effort will help assure all Joint forces the ability to access and exploit space resources, while denying that support to adversaries.

Discussion of Army Space Systems

Global Positioning System (GPS) Receivers

Description. GPS is a spaced-based radio positioning/navigation (POS/NAV) system that provides extremely accurate, continuous, all-weather, common grid, worldwide navigation, three-dimensional positioning, velocity and timing (PVT) information to land, sea, and air, and space users. Components are the space, ground control, and user equipment segments.

Program Status. The Defense Advanced GPS Receiver (DAGR) includes the Selective Availability Anti-Spoofing Module (SAASM) and will replace the current Precision Lightweight GPS Receiver (PLGR), which will be cascaded to other units, primarily in the RC.

The DAGR itself will be replaced by an improved DAGR in FY09-10, which will use a new constellation (GPS-III), which has increased signal power to mitigate jamming. Milestone III decision is projected for 2QFY03 with deliveries beginning in 1QFY05.

Grenadier BRAT Blue Force Tracking System and Mini-Transmitter (MTX) Blue Force Tracking System

Description. Grenadier BRAT (GB) and Mini-Transmitter (MTX) systems are blue-force tracking tools being fielded by SMDC's Army Space Program Office (ASPO). BRAT stands for Beyond-line-of-sight Reporting and Tracking, and as that name implies, the systems give commanders the ability to track and receive status reports, in near-real time, from friendly forces deep on the battlefield-when the unit mission requires or when line-of-sight communications with those forces are not possible. The primary components of the GB system include the transponder, a hand-held terminal (HHT), a small (approximately 3.5") UHF transmit antenna, and a Global Positioning System (GPS) receive antenna. The GB transponder measures 6 ½ " x 6 ½ " x 3" and weighs about 5 lbs. The GB is a ruggedized system but is small and light enough to be used in a variety of configurations; it can be man packed or mounted on military vehicles or aircraft. Users can send up to 250 different brevity codes to provide updates, request resupply, or signal an emergency. In the man-packed configuration the GB system uses a separate rechargeable battery pack, and when used in vehicles or aircraft the GB can connect directly to vehicle/aircraft power. GB and MTX systems substantially enhance security and reliability through the use of LPI/LPD waveforms, NSA-certified encryption, and military GPS. MTX is a smaller and lighter blue force tracking system better suited for use by dismounted forces. MTX measures 7 ½ " by 3 7/8" by 1 3/8" and weighs approximately 1.8 lbs. MTX uses internal batteries and can send up to 16 different brevity codes.

Program Status. 400 GB systems were initially produced and fielded by the ASPO to U.S. Army Special Operations Command (USASOC), U.S. Army Europe (USAREUR), and U.S. Army Forces Southern Command (USARSO). The GB system has been cited as a "Key Tool in the War on Terrorism," and the Army is currently procuring an additional 400 systems to support ongoing real-world contingency operations. 100 MTX systems are being produced and fielded by the ASPO.

Joint Tactical Ground Station (JTAGS)

Description. Joint Tactical Ground Station (JTAGS)/Multi-Mission Mobile Processor (M3P) JTAGS M3P is a pre-planned product improvement (P3I) of the current, operationally proven JTAGS system. JTAGS M3P is being procured as a part of the ground segment of the Space Based Infrared System (SBIRS), the successor to the Defense Support Program (DSP). JTAGS M3P is a transportable information processing and communications system that receives and processes direct and relayed downlink data from DSP and SBIRS sensors for processing and disseminating warning, alerting, and cueing information on tactical and strategic missile threats. The system is capable of supporting simultaneous operations in multiple theaters and provides the theater combatant commander near-real-time (NRT) tactical information, threat warning data for areas or potential point targets of high interest, and battlefield space characterization data for situational awareness. Consisting of an infrared (IR) data processor and communications equipment, JTAGS M3P is equipped with a 42-foot van, two 100kw generators, three 5-ton cargo trucks, one 5-ton tractor, three tri-band antennas, and one HMMWV.

Program Status. JTAGS M3P is incorporating a block acquisition approach to meet objective performance requirements. This approach secures an evolving and increasing capability to access the similarly evolving data provided by sensors as SBIRS constellations replace the aging DSP inventory. Block 1 assures the JTAGS M3P-DSP compatibility. The Army will field six DSP-compatible M3P systems beginning in 4QFY05. The transition to Block 2 will occur as the SBIRS High (HEO and GEO) satellites are launched and assume operational capability. The Army will upgrade the six systems with GEO/HEO software beginning in 2QFY09. JTAGS M3P Block 3 is planned as the Space Tracking and Surveillance System (STSS) (formerly SBIRS Low) satellites are integrated into the overarching constellation.

Space Control

Description. In response to an Operational Needs Statement the Army established an elementary space control capability from an existing Test and Evaluation (T&E) asset —Big Crow (BC). BC is a multi-faceted, multi-platform electronic warfare (EW) capability used to assess and stress electronic systems in development. The operational benefits demonstrated by BC are the stimulus for a follow-on capability that will expand a Combatant Commander's force protection and information dominance tool kit.

Program Status. Over the next year, the Army Space and Missile Defense Command will formulate the required documentation to support a Milestone-A decision for Space Electronic Warfare System (SEWS). The approved ONS, the Joint Space Control MNS, the Joint Space Control CRD, and DPG-2000 provide the baseline for this effort.

Appendix 6: Leveraging Information Technology and Innovative Concepts to Develop an Interoperable, Joint C4ISR Architecture and Capability That Includes a Tailorable Joint Operational Picture.

Objective Force Units will "See First" by detecting, identifying, and tracking the individual components of enemy units. The Objective Force will employ advanced technologies coupled with a ubiquitous array of networked ground, air, and space sensors. Together, these offer the commander an unprecedented picture of the battlefield. Sensors, reconnaissance formations, and data fusion systems, like the Joint Global Information Grid (GIG), coupled with innovative leader training will enable decision makers to view a synthesized, Common Relevant Operational Picture (CROP) of the battlefield. This CROP will provide near real time status and locations of friendly forces. This will enable the commander to develop and evaluate effective offensive and defensive courses of action while minimizing fratricide. The CROP will also enable the commander to know enemy locations and strengths, ascertain his intentions, and defeat him decisively.

The CROP produced by Seeing First will allow leaders of the Joint Force to understand what the enemy is doing, better anticipate his intentions, and proactively respond to his initiatives. Leaders at all levels will observe the CROP and simultaneously analyze and share assessments through a collaborative planning process enabled by information technologies. Objective Force commanders will leverage the leaders' intellects, experiences, and tactical intuitions to identify enemy centers of gravity and conceptualize solutions. This will create a collective genius through accelerated collaborative planning. The ensuing reduced decision cycle will enable Objective Force units to seize the initiative, build momentum, and maintain offensive pressure thereby achieving decisive outcomes.

The Army has already made important steps towards this goal. The Army Battle Command System (ABCS), and the C4ISR infrastructure for the Interim and digitized Legacy forces, provide a CROP to ground maneuver units. The artillery, and air and missile defense components of ABCS are interoperable with both joint and multinational systems. ABCS can also leverage theater assets, like JSTARS. During Division Capstone Exercises I and II, the Army's 4th Infantry Division demonstrated a significant increase in combat power when it exercised these capabilities. We will incorporate the lessons we learn from operating ABCS in developing the C4ISR infrastructure for the Objective Force. The Global Command and Control System, Army (GCCS-A) will form an integral component of the Deployable Joint Command and Control System (DJC2), a networked system of information systems to facilitate joint command and control.

The Army is already translating concepts into capabilities and concurrently developing a knowledge-based, battle command system that combines mentally agile, intuitive, self-aware, adaptive leaders at all levels with an execution-centric command and control system. As part of this effort the Army has created the "Army Knowledge Management" (AKM) concept which is an overarching design that includes and effects both tactical and institutional information management and extends from DoD level information systems down to the individual Soldier.

An initial step to implementing the AKM strategy is the integration of existing Army infostructure networks into an Army Knowledge Enterprise (AKE) in order to create efficiencies in performance and to secure information transport. The AKE represents the Army's extension of the Department of Defense Global Information Grid (GIG). This seamless integration with the GIG will enable the Army to effectively conduct Joint Net-centric Operations and Warfare. A key goal of AKM is to create the information structure and technological base that defines the Army Knowledge Enterprise Architecture (AKEA), which seamlessly operates and extends the Department of Defense GIG to tactical formations. The AKEA enables the global "factory-to-foxhole" reach/ reachback connectivity to deployed warfighters and those who support them.

The AKEA also supports the enterprise-wide capabilities of the future combat system's command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR), and the sustaining base. AKEA architectures are currently being used to support the fielding of SBCTs in order to maximize combat effectiveness while ensuring most effective allocation of information technology resources. AKEA is on critical milestone paths for the design and development of the new Unit of Action and Unit of Employment in the Objective Force. The newly established Army Architecture Integration Cell is being used to integrate warfighting and business domain requirements to ensure the effectiveness of Army forces that depend upon support from home installations while forward deployed. AKEA efforts in protocol and standards development and data management ensure interoperability, and are complemented by such new initiatives as Networthiness—assessing and certifying the ability of new systems to operate effectively on Army networks prior to their introduction. The Architecture Integration Cell will integrate, synchronize, and manage all Army architectures into the Army Objective Force Architecture (AOFA) which is needed to guide the Army transformation to the Objective Force.

The AKEA is the knowledge and enabling part of the AOFA. The AOFA will inform the requirements determination, acquisition, force management, and the planning, programming and budgetary processes enabling the Army leadership to make accurate and timely decisions that direct the implementation of the Objective Force.

Finally, the Army is developing a strategy to train and grow leaders educated for rapid synthesis of information, intuitive assessments of situations, and rapid conceptualization of friendly courses of action. These leaders will command units highly trained and disciplined in the use of information technologies.

Command and Control/Joint Common Relevant Operational Picture Capabilities

Command, Control, and Signal Systems enable seamless, protected, survivable, integrated, and dynamic information services to the warfighter for achieving Information dominance across the full spectrum of operations. The Single Integrated Ground Picture (SIGP) is a key part of the CROP and is the Army's contribution to the joint common operational picture. SIGP is the collection, correlation and display of force level data that depicts current locations, battlefield geometries, resources and status' of friendly and other ground battlefield actors. SIGP uses fused, near real-time and real-time data, scalable and filterable, to support situational awareness, battle management, and ground target engagements. SIGP will enable leaders at all levels to fight and win decisively.

Joint Tactical Radio System (JTRS) and Warfighter Information Network-Tactical (WIN-T) are key Objective Force C2 systems that will provide the warfighter with relentless domination of the battlespace. These information technology systems provide the capability for getting relevant information to the right place at the right time on the modern battlefield. Modernizing the Army to be an agile, lighter, and more deployable force capable of maintaining Information Superiority (IS) and situational awareness with cutting edge C2 and Signal Systems is absolutely critical to the success of the Objective Force. While the priority is the Objective Force, the Stryker Brigade Combat Teams and selected Legacy Force units will also receive priority support. A broad overview of some key programs and their relationship to modernization goals are discussed in the following paragraphs.

Discussion of Key Equipment

War fighter Information Network- Tactical (WIN-T)

Description. WIN-T is the integrating communications network for the Objective Force, optimized for offensive and joint operations, while providing the Theater Combatant Commander the capability to perform multiple missions simultaneously with campaign quality. It will be a framework, which will set standards and protocols for Objective Force infospheres while interfacing with and/or replacing equipment in Legacy and Interim Forces.

Program Status. WIN-T went through a source selection evaluation board in FY02, awarded two contracts to define detailed system architecture. Upon successful completion of milestone B decision in 4QFY03, the program will continue through its System Integration Phase of development.

Joint Tactical Radio System (JTRS)

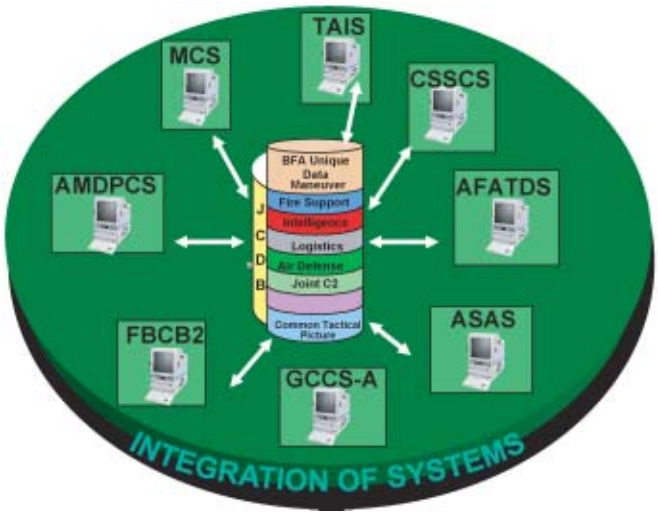
Description. In concert with the other Services, the Joint Tactical Radio System (JTRS) will become the Army's primary tactical radio for mobile communications. This lightweight, multi-band radio will provide embedded voice, data, and video teleconference capability. Additionally, it will replace multiple legacy radio systems within the Army's inventory and will be a key component of the TI. JTRS will provide a family of affordable, high-capacity, modular communications systems for line-of-sight (LOS) and BLOS command, control, communications, computers, and intelligence (C4I) capabilities for the war fighter. This system is being designed as secure, multi-band, multimode, software reprogrammable, digital communications system that will support the broad range of C4I requirements.

Program Status. JTRS is currently in the system development and validation phase. Milestone C is scheduled for FY05, Operational Test and Evaluation is scheduled for FY06 and full rate production is planned for FY07. Procurement for vehicular and dismounted JTRS is not funded and will be prioritized in future planning periods.

Army Battle Command System (ABCS)

Description. ABCS is the Army's component of the GCCS. It is a complex system of systems that provides the mechanism to receive and transmit information among the joint forces.

ABCS consists of subsystem software that provides specific support for the Battlefield Functional Areas, including the Maneuver Control System (MCS), All Source Analysis System (ASAS), Advanced Field Artillery Tactical Data System (AFATDS), Air and Missile Defense Planning and Control System (AMDPCS), Global Command and Control System-Army (GCCS-A), Combat Service Support Control System (CSSCS) and the Force XXI Battle Command Brigade and Below System (FBCB2). Additionally, common software products enable information sharing with other systems and provide situational awareness of the battlefield to every echelon. By integrating the ABCS components through common software products such as the Joint Common Database (JCDB), the common tactical picture can be viewed at any workstation and within the operator's specific requirements.



Program Status. The Army will continue development of ABCS to version 7.0 and no further. Designed with dedicated Tactical Operations Center (TOC) servers, this version of software will provide a stable ABCS software system for units Corps and below. ABCS v7.0 will serve as the baseline software version for Army units until they transition to Objective Force organizations with future Objective Force Battle Command Information Systems. Interoperability between ABCS v7.0 and future Objective Force Battle Command Systems will provide a bridge between Current and Objective Forces.

An Army working group is reassessing ABCS distribution in the current force based upon lessons learned while providing support to the Commander, Land Forces Component Command (CFLCC), CENTCOM. The working groups are tasked to assess current distribution and sustainment strategy to see what initiatives can take place in order to promote ABCS interoperability across the Army.

Global Command and Control System-Army (GCCS-A)

Description. GCCS-A is a computer-based automated command and control system, which is interoperable with the ABCS systems and provides a seamless Army extension to the GCCS at EAC. GCCS-A applications and support software will be both compatible and compliant with ABCS. Common open systems hardware architecture is used within the Army to implement GCCS-A/GCCS to include a combination of government off-the-shelf (GOTS) and commercial off-the-shelf (COTS) hardware and software.

Program Status. GCCS-A is a fielded system that continually evolves based on validated operational requirements, the technical requirements of maintaining GCCS joint, DII COE and ABCS compatibility and the need to maintain technically up-to-date equipment to support the software.

Maneuver Control System (MCS)

Description. MCS is an automated C2 system that provides a network of computer terminals

to process combat information for battle staffs. It provides automated assistance in the collection, storage, review, and display of information to support the commander's decision process. Its key role is integration of enemy, friendly, terrain and weather. Additionally, it integrates the battlefield operating systems into combined arms displays. Both text and map graphics are provided to the user.

Program Status. The MCS Block IV Program is in the Engineering and Manufacturing Development (EMD) phase scheduled for an Initial Operational Test and Evaluation (IOT&E) late FY03 or early FY04.

Combat Service Support Control System (CSSCS)

Description. The Combat Service Support Control System (CSSCS) is a decision-support system that assists commanders and their staffs in planning and executing combat service support (CSS) operations and is key to building and sustaining combat power. CSSCS will rapidly collect, store, analyze and disseminate critical logistics, medical, and personnel information. CSSCS is the CSS component of the Army Battle Command System (ABCS), as well as a key logistic enabler in the Army's Transformation efforts and will be interoperable with GCSS-A.. CSSCS is comprised of computer units, common operating software and CSSCS unique software. CSSCS is deployable in a table-top configuration, with or without storage/ transit cases, and in Standardized Integrated Command Post Systems (SICPS) configurations.

Program Status. CSSCS is in full production. Fielding began with III Corps in 1996. Fielding will continue to the Counterattack Corps and SBCTs through 2008.

The All Source Analysis System (ASAS)

Description. ASAS provides Legacy and Interim Forces with accurate, clear, relevant, timely, and predictive automated intelligence about the threat and the operational environment that the Commander and his staff need to plan and execute battles, engagements, and other missions across the full spectrum of operations in both a structured and non-structured threat environment. ASAS assists the Commander in visualizing the battlespace, organizing his forces, and controlling operations to achieve the desired tactical objectives or end state. Inherent within ASAS is the capability to plan and direct ISR operations, produce relevant information and intelligence, and disseminate intelligence and other critical information in an understandable format to those who need it, when they need it.

Program Status. ASAS Block II is in EMD with several components in full rate production.

ASAS Block III development also will start in FY05 as part of the DCGS-A program.

Air and Missile Defense Command & Control System (AMDCCS)

Description. The AMDCCS provides both command and control and a sensor-to-shooter link for AMD operations. It consists of two components—Forward Area Air Defense Command and Control (FAAD C2) and Air and Missile Defense Planning and Control System (AMDPCS). AMDCCS fully automates C4ISR, integrates AMD sensors, weapons and C3I, and interfaces with ABCS, GCCS and Joint and Allied C4I. It provides AMD elements and ADA brigades with a fire control system via the Air Defense System Integrator (ADSI) for monitoring and controlling engagement operations by subordinate battalions. AMDCCS provides a common air and missile defense staff planning and battlespace situational awareness tool via the Air and Missile Defense Workstation (AMDWS), which presents airspace situational understanding to Army commands. AMDWS also provides interoperability with Joint Theater Air and Missile Defense (JTAMD) forces. AMDCCS capability for SBCTs and selected Legacy Force units will be provided through the fielding of the Air Defense and Airspace Management (ADAM) cell.

Program Status. FAADC2 is an ACAT II program in procurement with an August 1995 approved Operational Requirements Document (ORD). AMDPCS is an ACAT III program in final development with a May 1997 approved ORD currently under revision. The FY04-09 Plan funds FAADC2 and AMDPCS to Counterattack Corps units and ADAM cells for all SBCTs.

Force XXI Battle Command Brigade and Below System (FBCB2)

Description. FBCB2, mounted on a variety of platforms, provides situational awareness and C2 functionality to the warfighter and tactical leader. The system consists of FBCB2 hardware and/or software integrated into the various platforms at brigade and below, as well as appropriate division and corps slices (including RC elements supporting the Counterattack Corps) necessary to support brigade operations. The FBCB2 hardware consists of a computer employing commercial-off-the-shelf components in a ruggedized central processing unit case, display, and keyboard. FBCB2 integrates emerging and existing communications, weapon, and sensor systems on a single display. It interfaces with the Army Tactical Command and Control System (ATCCS) at brigade and battalion levels across all battlefield functional areas. FBCB2 is a subelement and key component of the ABCS.

Program Status. FBCB2 is currently preparing for an Initial Operational Test and Evaluation in FY03 or FY04. EMD models have been fielded to 4th Infantry Division. SBCT is ongoing and will continue through 2008.

Combat Service Support Information System Interface (CAISI)

Description. The Combat Service Support Automated Information System Interface (CAISI) was developed to provide CSS Standard Army Management Information Systems (STAMIS) with an automated access to battle command systems and networks. CAISI uses off the shelf technology to enable this capability.

Program Status. CAISI is currently being fielded to SBCT's and is being selectively fielded to other forward deployed ABCS-equipped units.

Single Channel Ground and Airborne Radio System (SINCGARS)

Description. SINCGARS provides commanders with a highly reliable, secure, easily maintained Combat Net Radio (CNR) that has both voice and data handling capability in support of C2 operations. SINCGARS, with the Internet controller, provides the communications link for the digitized force. The Advanced System Improvement Program (ASIP) models are of a reduced size and weight, providing further enhancements to operational capability in the Tactical Internet environment.

Program Status. A production delivery order was awarded in 3QFY01 to procure congressionally directed assets for the Army National Guard (ARNG) and SBCT. Approximately 229,778 radios have been fielded.

Army Common User System (ACUS) Modernization Program [Mobile Subscriber Equipment (MSE) and Tri-Service Tactical Communications (TRI-TAC)]

Description. ACUS is the terrestrial communications and information system that currently consists of the TRI-TAC and MSE systems. Upgrades to the systems provide an increased capability to support voice, data, and video requirements in one of two ways-Tactical High Speed Data Network (THSDN) and technology insertion. The ACUS modernization efforts will support the Army's Transformation initiatives by inserting new technologies (Brigade Subscriber Node (BSN), battlefield video-teleconferencing, wireless LAN, and Network Operations Center vehicles (NOC-V)) into the Army's SBCTs. ACUS modernization will also upgrade the currently fielded TRI-TAC in theater-level signal units.

Program Status. The ACUS Technology Insertion is on track for fielding completion to the Counterattack Corps by 2004. Additionally, THSDN fielding to the remainder of the force was initiated in FY00 with completion anticipated in FY03.

Command and Control/Joint Common Operational Picture Capabilities Summary

21st century Command, Control, Communications, Computers and Intelligence capabilities are at the very core of realizing the

required characteristics envisioned in the Objective Force. Internetted communications and intelligence packages will dramatically improve command and control making it possible to achieve significant advances in strategic responsiveness The Army has already made important steps towards this goal. The ABCS and the C4ISR infrastructure for the Interim and digitized Legacy forces provides a Common Relevant Operational Picture to ground maneuver units. The artillery, and air and missile defense components of ABCS are interoperable with both joint and multinational systems. ABCS can also leverage theater assets, like JSTARS. During Division Capstone Exercises I and II, the Army's 4th Infantry Division demonstrated a significant increase in combat power when it exercised these capabilities.

The Army will incorporate the lessons we learn from operating ABCS in developing the C4ISR infrastructure for the Objective Force. FBCB2, the primary Army Situational Awareness/C2 system supporting SATCOM-based Blue Force Tracking (BFT), is being used in III Corps, the SBCT, the Balkans and now Southwest Asia. The other pure BFT system coming into use is the Space Based Grenadier Brat/MTX system being fielded to SOF and also in SWA. The GCCS-A will form an integral component of the Deployable Joint Command and Control System (DJC2), a networked system of information systems to facilitate joint command and control. All of these systems are critical in achieving IS in the 1st Cavalry Division (2003) and III Corps (2004), followed by the Stryker Brigade Combat Teams (SBCTs) and Army Special Operation Forces (ARSOF) units.

Annex D Summary

Annex D of the 2003 Army Modernization Plan provided an overview of key Army systems being funded in PB04 and framed them by the critical operational goals established by DoD. Focusing on these goals provides the Army with needed direction and guidance, thereby ensuring that Army Transformation efforts stay on the correct path and provides DoD with the dominant land force capability required for decisive victory in the joint warfight.

Other annexes in the *2003 Modernization Plan* examine the modernization paths of Doctrine, Training, Installations, Personnel and Force Structure.